NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

For Release:
January 3, 1990

Mike Simmons
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(Phone: 205/544-0034)

RELEASE: 90-1

EDITORS NOTE: STS-32 SPACE SHUTTLE MISSION BRIEFINGS SET

A series of background briefings and the pre-launch press conference for Space Shuttle mission STS-32, set for launch at 7:10 a.m. CST on January 8, will be held Jan. 5, 6 and 7 at the NASA Kennedy Space Center, Florida.

All briefings will be carried live on NASA Select TV (Satcom F2R, transponder 13, 72 degrees west longitude, 3960.0 MHz, audio monaural 6.8 MHz). Two-way question-and-answer capability will be available at other NASA centers, including the Marshall Space Flight Center in Huntsville. Media representatives interested in participating in the briefings at Marshall should report to Marshall Communications, Building 4207, on Rideout Road south of the Marshall Headquarters Building.

Your news operation is welcome to cover both the local and national aspects of this mission from the Marshall Space Flight Center in Huntsville, Ala. One of the purposes of this mission is to retrieve the Long Duration Exposure Facility, a collection of experiments that have been orbiting the Earth for the last five years. Eight of the 57 experiments aboard are managed at Marshall. Marshall scientists will be observing live television coverage of their experiments on LDEF prior to its stowage in the Shuttle cargo bay.

As with every Shuttle mission, Marshall is responsible for the Shuttle's main propulsion elements -- the external tank, main engines, and solid rocket boosters. Prior to and during launch, engineers in a special support center at Marshall will monitor data from the Shuttle and provide support to the launch team at the Kennedy Space Center. Additionally, Columbia will carry two Marshall-managed middeck payloads: a protein crystal growing experiment and an experiment designed to gather nighttime images of lightning.

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The following is the STS-32 Briefing Schedule. All times are Central Standard Time. All events will be carried Live on NASA Select:

Friday, Jan. 5 (L-3)
8:00 a.m. LAUNCH COUNTDOWN STATUS

Saturday, Jan. 6 (L-2)
8:00 a.m. LAUNCH COUNTDOWN STATUS

9:00 a.m. SYNCOM
- Pat Phillips, Moderator
- Ralph Schuiling, STS-32 Payloads Manager, KSC
- U.S. Navy Representative
- Hughes Aircraft Representative

10:00 a.m. CHARACTERIZATION OF NEUROSPORA CIRCADIAN RHYTHMS
- Jane Hutchison, Moderator
- Dr. James S. Ferraro, PI, Southern Illinois Univ.

12:00 noon COMMERCIAL PAYLOADS - B. Selby, Moderator

PROTEIN CRYSTAL GROWTH
- Michael Smith, NASA Commercial Programs Office
- Dr. Charles Bugg, Lead Investigator, Univ. of Ala.-Birmingham

FLUID EXPERIMENT APPARATUS
- Max Villejo, Rockwell
- Don Thomas, Johnson Space Center

1:00 p.m. LONG DURATION EXPOSURE FACILITY
- Jean Clough, Moderator
- William H. Kinard, LDEF Chief Scientist, LaRC
- Dean Zimmerman, LDEF Launch Site Support Mgr, KSC

Sunday, January 7 (L-1)
8:00 a.m. LAUNCH COUNTDOWN STATUS

10:00 a.m. PRE-LAUNCH PRESS CONFERENCE
- William B. Lenoir, Associate Administrator for Space Flight
- Robert L. Crippen, Director, Space Shuttle Program
- Robert Sieck, Launch Director, KSC
- Air Force Weather Officer

Media planning to cover the briefings from the Marshall Center should call the Public Affairs Office at 544-0034 to confirm the times. Media may view launch television coverage from the NASA Newsroom in Bldg. 4200 beginning at 6:00 a.m. January 8.

- END -

NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

For Release

Mark Hess
Headquarters, Washington, D.C.
(Phone: 202/453-4164)

January 17, 1990

Jerry Berg
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RELEASE: 90-9

FIRING 'OLD' SHUTTLE ROCKET MOTORS HAS BENEFITS FOR FUTURE

Key design changes in the Space Shuttle's solid rocket motors, made following the Challenger accident in 1986, have long since been completed and certified flightworthy by extensive testing. The redesigned rockets have successfully boosted the Shuttle into orbit eight times since September 1988.

So why is NASA conducting ground firings of Shuttle solid rocket motors of the pre-Challenger design? Because, static firings in the Technical Evaluation Motor series are yielding a variety of benefits for the agency's solid rocket motor program, managed by the Marshall Space Flight Center in Huntsville, Ala.

The primary reason for conducting the firings is to reclaim millions of dollars worth of solid rocket motor casings and associated hardware for future reuse. The casings are specially forged, 12-foot-in-diameter cylindrical metal segments in which propellant is poured and cast, creating the four massive elements from which each 126-foot-long motor is assembled.

Casings are refurbished and reused as many as 20 times. In normal operations, the expended motors are recovered from the ocean following the Shuttle's ascent, then disassembled and inspected, after which the casings and other components are recycled.

At the time of the Challenger accident, 11 solid rocket motors had been produced but not used. With minor rework, the reusable components of these motors are interchangeable with those on the current-design motor. But, since there is no practical, safe way to scrape or wash the highly flammable propellant out of the segments, the motors have to be fired to reclaim the hardware.

"The Shuttle program has accelerated to a launch rate near that which was under way at the time of the Challenger accident," said Royce Mitchell, manager of the Redesigned Solid Rocket Motor project at the Marshall Center. "The use of these reclaimed motor segments is vital to supporting our flight manifest and represents several million dollars in cost savings to the Shuttle program," Mitchell added.

Three of the Technical Evaluation Motor firings -- those scheduled for the fall of 1990 through the spring of 1991 -- will serve another purpose equally vital to maintaining the Shuttle's future flight schedule. NASA is currently in the process of qualifying a new supplier for a type of rayon yarn used in nozzle components of the solid rocket motor. The quality and characteristics of the rayon can be only partially assessed with laboratory tests. To fully certify that the material meets specifications for flight, it must be used to fabricate actual nozzle components, which then must be subjected to full-duration motor firings. The technical evaluation motors provide a low-cost opportunity to do this, since the pre-Challenger motors contain the same 1.1 million pounds of propellant as in the current design, producing the same environments and demands on the nozzle as a current flight motor.

As an added benefit, the firings provide an opportunity for engineers to obtain new data that will expand their knowledge about motor performance in general.

"For instance, the effects of aging and storage are important to understand. The last of these motors will be several years old when fired, so the data will be very valuable for technical assessment," Mitchell explained.

The test series is being conducted by Thiokol Corp., NASA's prime contractor for the solid rocket motor program, at the company's northern Utah test facility. The firings began in November 1988, with four motors fired thus far. Tests are scheduled to continue through late 1991.

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George C. Marshall Space Flight Center
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For Release

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January 24, 1990

RELEASE NO: 90-11

REIGNING MISS AMERICA TO VISIT HUNTSVILLE

The reigning Miss America, Debbye Turner, will visit the city of Huntsville on February 1 and 2 and participate in a number of community events during her stay, including a speaking engagement and musical performance at NASA's Marshall Space Flight Center.

Her visit is being sponsored by the newly-formed Coalition for Black Cultural Development, a local organization made up of representatives from Marshall's Black History Committee and African-American Resource Group, Alabama A&M University, the University of Alabama in Huntsville, Oakwood College, and the Space and Rocket Center. According to the organization's chairman, Joseph Hobson of Marshall's Procurement Office, the various institutions came together and formed the coalition expressly to host the Miss America visit - but he said the new organization will be planning other events to benefit the community in the future.

(MORE)

Ms. Turner is scheduled to arrive at the Huntsville International Airport at 3:15 p.m., Thursday, February 1 where she will be greeted by local officials and receive the key to the city from Huntsville Mayor Steve Hettinger and a special proclamation from State Banking Commissioner Zack Thompson, who will be representing Alabama Governor Guy Hunt. **(NOTE: A more detailed note to editors detailing arrangements for covering the Miss America visit events will be forthcoming from Marshall Public Affairs.)**

Miss America and her escorts will then travel to the University of Alabama in Huntsville for a 4:30 p.m. student reception in the UAH University Center - an event to which the public is invited.

That evening 1990's Miss America will be the special guest at the Black History Banquet sponsored by Oakwood College to benefit the United Negro College Fund. The banquet will begin at 7:30 p.m. in the North Hall of the Von Braun Civic Center. (Tickets for this event are on sale at $25 for adults and $10 for students.)

Ms. Turner's day will begin on Friday, February 2 with a speech and singing performance in the Morris Auditorium of the Marshall Space Flight Center. The theme of that 9 a.m. presentation for Marshall employees will be "Black Americans Launch for a Positive 21st Century." While at Marshall, Miss America will also hold a news conference and tour the center's Space Station Freedom mockup.

(MORE)

Miss America will speak again that day to the faculty, staff, and students of Alabama A&M University at 1 p.m. in A&M's Elmore Building. The public is invited to attend.

Ms. Turner's final appearance before her departure from the city will be a 3 p.m. address to a group of minority and disadvantaged students being hosted by the Space and Rocket Center. She will also tour the Space and Rocket Center's Space Camp training area.

Debbye Turner was born on September 19, 1965 and is the daughter of Lt. Colonel (Ret.) Frederick C. Turner, Jr., and Gussie L. Turner of Columbia, Missouri. She graduated with honors from Arkansas State University and is now pursuing post graduate studies at the University of Missouri-Columbia Veterinary School with the goal of earning a Doctorate of Veterinary Medicine. She has received years of training in music, including instruction in singing, percussion, marimba, and piano; and is also schooled in gymnastics and ballet. She was crowned the new Miss America in September of 1989.

Ms. Turner has established a special campaign during her Miss America reign to "motivate America's youth to excellence." She has expressed her desire to serve as a role model to all of the nation's young people, encouraging them to avoid the perils of peer pressure and to make a stronger commitment to educational excellence and community service.

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SCHEDULE

MISS AMERICA'S VISIT TO HUNTSVILLE

Thursday, February 1 -

3:15 p.m.	Arrives in Huntsville; Receives Key to City & Governor's Proclamation	Huntsville International Airport, Skycenter Hotel Madison Room, 2nd Fl, Main Terminal Bldg.
4:30 p.m.	Attends Student Reception	University of Alabama in Huntsville, University Center
7:30 p.m.	Keynote Speaker, Oakwood College Black History Banquet for UNCF	VBCC North Hall

Friday, February 2 -

9:00 a.m.	Speaks, Sings for MSFC Employees	Marshall Space Flight Center, Morris Auditorium
10:15 a.m.	News Conference	MSFC, ViTS Room Building 4200
10:45 a.m.	Tours Space Station Freedom Mockup	MSFC, Building 4755
1:00 p.m.	Speaks to A&M Students, Faculty and Staff	Alabama A&M University, Elmore Building
3:00 p.m.	Speaks to Minority & Disadvantaged Students & Tours Space Camp	Space & Rocket Center Space Camp Training Area
6:55 p.m.	Departs Huntsville	Huntsville International Airport

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February 26, 1990

RELEASE NO:90-22

SCHWINGHAMER HONORED AS ONE OF TOP 10 FEDERAL ENGINEERS

Robert J. Schwinghamer, deputy director for Space Transportation Systems in the Marshall Space Flight Center's Science and Engineering Directorate, was honored February 22 as one of the top ten engineers in the Federal Government. He was honored at the 11th Annual Federal Engineer of the Year Awards Banquet in Arlington, Va. Schwinghamer previously was selected as one of NASA's three Engineers of the Year.

The purpose of the awards program is to recognize contributions of engineers working in design, research, development or management in the Federal Government.

"A pioneer in the field of space exploration, Mr. Schwinghamer has contributed immeasurably during his 32-year career, to the broad area of materials and process engineering

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and is credited with more than 75 significant domestic and foreign papers and presentations, along with 19 U.S. and foreign patents," Marshall Center Director Jack Lee said in nominating Schwinghamer for the award.

As deputy director for Science and Engineering, he serves as the focal point for engineering expertise for space transportation systems projects, with particular emphasis on engineering for the Space Shuttle, Orbital Maneuvering Vehicle, Inertial Upper Stage and the Transfer Orbit Stage.

The Jasper, Ind. native received a bachelor of science degree in electrical engineering from Purdue University in 1950 and a master of science degree in management from the Massachusetts Institute of Technology in 1968.

His federal career spans more than three decades. He entered federal service in 1957 as a research engineer with the U.S. Army Ballistic Missile Agency which was engaged in advancing materials technology into the space age and participated with the late Dr. Wernher von Braun and his rocket research and development team in the development of the Redstone and Jupiter ballistic missile program.

Since his transfer to Marshall Center in 1960, he has served in both technical and managerial positions and contributed significantly to the success of the Apollo-Saturn,

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Skylab, High Energy Astronomy Observatory, Apollo Soyuz and Inertial Upper Stage projects. He held increasingly responsible positions, as chief of the Materials Division in the Astronautics Laboratory in 1969 and then as director of the Materials and Processes Laboratory, a position he held from 1974 until appointed to his current position in 1989.

As director of Materials and Processes Laboratory, he spearheaded the innovative in-house development of low-cost thermal protection material for the solid rocket booster and spray-on foam insulation for the external tank. His continuing contributions to improvement of the turbine blades and bearings for the Space Shuttle main engine have led to improved performance and longer engine life.

Research fields in which he specialized include advanced metal forming and joining, compatibility of materials in liquid and gaseous oxygen, space environmental effects on materials, and research in special materials and processes for space vehicles. He is an internationally recognized authority on materials and manufacturing of space vehicles. The Center's Productivity Enhancement Complex, which he conceived and managed, has produced projected cost avoidance of $215 million in the Space Shuttle Program. The complex was recently awarded the President's Council on Management Improvement award.

-More-

He and his wife, the former Constance Gramelspacher of Jasper, have four children: Elizabeth Schwinghamer Tomlin of Greenville, S.C; Dr. Denise Schwinghamer (D.V.M.) of Birmingham, Ala.; Antoinette Schwinghamer also of Birmingham; and Robyn Schwinghamer Hilborn of Texarkana, Tex.

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RELEASE NO:90-25

MARSHALL'S DAN CARTER SELECTED AS NASA'S INVENTOR OF THE YEAR

The Marshall Space Flight Center's Dr. Dan Carter, inventor of the Human Serum Albumin Crystals and Method Preparation, has been selected as NASA's Inventor of the Year, based on U. S. Patent 4,833,233 which was issued May 23, 1989.

Carter, who works in the Space Sciences Laboratory, and his colleagues used a technique known as X-ray crystallography to successfully determine the three-dimensional structure of human

serum albumin, the most abundant plasma protein in the human circulatory system. Knowing the molecule's structure may allow pharmaceutical companies to design new drugs or alter existing drugs so they may be carried more efficiently through the body.

Carter was the unanimous choice of NASA's Inventor of the Year Panel. He will receive a cash award, a plaque and a certificate at a Headquarters ceremony March 29 in Washington D.C.

In addition, the panel said Carter will represent the agency in the annual competition for the national award by the Intellectual Property Owners, Inc. At times, the panel has selected one invention for the NASA award and another invention with greater commercial use for the national award. However, this year, the agency felt Carter's work filled both requirements.

The Marshall group has now successfully mapped the structure of the protein to a resolution of four angstroms, providing an image with enough detail to extract important information about individual molecules. The scientists' next step will be to determine the molecular structure to a resolution of three angstroms with the hope of eventually using space-grown crystals to further refine details of the protein molecule. This higher resolution will help identify individual amino acids of the molecule, a process that could require another year.

Identifying the structure of human serum albumin has been the goal of crystallographic investigations for many years. Studies have focused on the protein's ability to bind substances.

"We knew that the protein binds and transports a wide variety of exogenous and endogenous ligands such as calcium, copper, fatty

and amino acids, hormones and an incredible spectrum of therapeutic drugs," Carter said.

"Now, knowing the structure, we can determine which regions of the molecule are active in substrate binding."

Already, the scientists have determined how aspirin and the diazapines (valium) are transported by this molecule through the circulatory system.

"Eventually, the higher resolution structure will allow us to understand the chemical mechanisms of the binding process," Carter said. This further understanding of the chemistry of this molecule will allow scientists to conduct experiments in rational drug design. This method could potentially be used to reduce the binding of various pharmaceuticals to human serum albumin, thereby increasing their activity and decreasing the effective dose. Furthermore, there are interesting and important cases where newly developed drugs are rendered ineffective by virtue of their interaction with human serum albumin.

"Our work has already suggested that the most sensible approach to this problem may be to use this information to develop an inhibitor molecule to human serum albumin which could block the active regions of the molecule during certain types of drug therapy," Carter said.

"Most of the hard work is behind us," Carter says. "Now that we know how to obtain this resolution, it's a matter of systematically refining the details. But scientists will be studying applications for the protein molecule for a long time."

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March 14, 1990

RELEASE NO: 90-27

MARSHALL'S HUNTSVILLE SUPPORT OPERATIONS CENTER
SUPPORTS A VARIETY OF NASA MISSIONS

The Huntsville Operations Support Center (or "HOSC") at the Marshall Space Flight Center is a key operations center that has supported NASA space operations since the early sixties, and will continue to serve the space agency into the next decade.

"The job the HOSC performs is so diversified today compared to what we did back in the early Saturn period," said Fletcher Kurtz, director of the Marshall Mission Operations Laboratory which houses the HOSC.

"The purpose of the HOSC today has grown to be the umbrella organizational structure as well as the facility responsible for providing real-time mission operations support activities at Marshall," Kurtz added.

"The HOSC provides an engineering support-type function as well as support for all Spacelab missions through the Payload

-More-

Operations Control Center (POCC)," said Bill Beutjer, manager of the Huntsville Operations Support Center.

"During each Space Shuttle launch, the HOSC is activated at approximately launch minus 81 hours. Then 10 to 12 hours before the launch, approximately 200 NASA and contractor people assemble in the HOSC to support the countdown.

"Their purpose is to evaluate and help solve any problems that might occur with Marshall-developed Space Shuttle propulsion system elements, including the Space Shuttle main engines, external tank and solid rocket boosters," Beutjer said. The data providing information on the health of these systems is gathered by sensors aboard the Shuttle and is instantaneously transmitted from the launch site at the Kennedy Space Center in Florida to the Huntsville Operations Support Center.

During each launch, engineering personnel view the Shuttle via two closed circuit television lines. They also have access to more than 25 direct communication lines that link them with the Kennedy launch site, the Mission Control Center at the Johnson Space Center in Houston and with the Shuttle propulsion system contractor plants.

If a problem is detected by experts in the HOSC, engineers on the consoles alert appropriate officials at Kennedy and Johnson as well as operations center managers in the Shuttle Action Center in the HOSC.

The HOSC continues to provide support during the mission depending on the payload, Beutjer added.

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HOSC personnel also support other space operations from their support center consoles.

"We will have a major role to play in the next launch with the deployment of the Hubble Space Telescope (HST). The HOSC will support the HST orbital verification period 24 hours a day, 7 days a week. That period could last for several months," Beutjer said.

"In May, with the HST mission going around the clock, the HOSC team will be challenged with the launch of the Astro Spacelab mission," said Kurtz.

"We will provide our normal engineering support for the Shuttle, plus we will begin payload operations from the Payload Operations Control Center in the HOSC while still supporting HST," he added.

Additionally, the HOSC provides engineering support for Inertial Upper Stage (IUS) deployments and partial payload experiments from the HOSC facility.

"More lies ahead for the future. After, we finish our suppport of HST, we will begin converting the HST area into an Advanced X-Ray Astrophysics Facility Control Center (AXAF). The Marshall Center will have the responsibility for mission operations for AXAF. The control center and engineering support will be provided from Marshall," Kurtz said.

"In fact, if you look at the Shuttle manifest through fiscal year 1992, we will provide major support to 15 of 27 planned

-More-

missions: 10 Spacelab missions, HST, two IUS missions, the Tethered Satellite System and a partial payload called United States Microgravity Payload-1.

"There is no question about it, as the Center accepts more mission responsibilities, the role of the Marshall HOSC becomes more important," Kurtz concluded.

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March 21, 1990

RELEASE NO: 90-30

GRAVITY PROBE-B PROGRAM MISSION STUDIES AWARDED

NASA announces the award by Stanford University of two fixed price, One Million Dollar, Science Mission Studies contracts for the Gravity Probe-B (GP-B) Program to Lockheed Missiles and Space Co. Inc. and Fairchild Space Company. These efforts are subcontracts to support Stanford University (under contract to Marshall Space Flight Center) in the studies of satellite concepts and critical interfaces to the GP-B science payload being developed by Stanford.

The GP-B Program is an innovative test of three aspects of Einstein's General Theory of Relativity using orbiting Gyroscopes. Stanford is developing a test payload of critical subsystems to be flown on the Space Shuttle in 1993. The Science Mission would be launched by an expendable launch vehicle in the late 1990's.

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For Release:
March 30, 1990

RELEASE NO: 90-50

X-RAY CALIBRATION FACILITY TASK TEAM ESTABLISHED AT MARSHALL SPACE FLIGHT CENTER

While NASA scientists are overseeing the design and future development of the Advanced X-ray Astrophysics Facility (AXAF), Marshall Space Flight Center engineers are already managing the construction of a highly complex ground-test facility that will play a major role in AXAF's success.

Following in the footsteps of the High Energy Astronomy Observatory, also called the Einstein Observatory, AXAF will point toward a pre-specified region of the sky and will study all types of astronomical objects from normal stars to quasars with unprecedented sensitivity.

But before the telescope ever reaches Earth orbit by way of a Space Shuttle, an X-ray Calibration Facility Project Integration Task Team will guide the development of the Marshall structure that will allow testing of the mirrors and science instruments that are the heart of the AXAF Observatory. The task team, headed by James H. Newton, former deputy director of the Test Laboratory,

-More-

will manage the facility's construction by pulling together the myriad organizations with an interest in the project.

"Besides the Marshall organizations involved in the construction, TRW, Kodak and Hughes Danbury, among others, also have roles to play in the work," Newton said. "Because of the complexity of the project, Center management felt a team should be established to oversee the work on a full-time basis."

The very nature of AXAF means the test facility here, which will be located next to Bldg. 4708, will carry on highly sensitive X-ray emission calibrations. Once in orbit, the telescope will use concentric, cylindrical mirrors with highly polished surfaces. Incoming X-rays will strike those surfaces and will be brought to a focus approximately 33 feet from the cylinders. The result will be an eight- to tenfold improvement in resolution from the Einstein Observatory. And with AXAF a hundred times more sensitive than Einstein, a greater portion of the X-ray spectrum will be accessible for X-ray imaging.

In order to test AXAF's mirrors for that kind of mission, the project's chief scientist, Martin Weisskopf, and others, will use the Marshall facility for X-ray emission and calibration work. Weisskopf said when work is completed on the facility, X-rays will be sent through a 1,700-foot tube striking AXAF's mirrors. In this way, Marshall scientists will calibrate how the mirrors react to the various X-ray emissions and better understand the telescope's performance in space.

Completion of phase one work is expected in April 1991. Phase two work should end two years later, Newton said. Actual

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calibration of test mirrors is scheduled to start in August of next year, but the AXAF mirrors and instruments won't arrive at Marshall until 1994.

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April 16, 1990

RELEASE NO: 90-59

ALABAMA CONTROL CENTER TO DIRECT SPACE SHUTTLE SCIENCE MISSIONS; "HUNTSVILLE" TO JOIN "HOUSTON" AS CALL SIGN FROM SPACE

When science astronauts call Earth from aboard the Space Shuttle Columbia next month, they will be communicating directly with a control center in Alabama. For the first time, "Huntsville" will join "Houston" as a call sign from space for major Space Shuttle science missions.

NASA's new Spacelab Mission Operations Control facility at the Marshall Space Flight Center in Huntsville, Ala., will be inaugurated in mid-May when it controls Astro-1, a nine-day astronomical research flight. Astro will study a violent, ever-changing universe with an array of complex X-ray and ultraviolet telescopes.

From the agency's new control center in Huntsville, teams of controllers and researchers will direct on-orbit science operations, send commands to the spacecraft, receive

-More-

the Houston-based Johnson Space Center.

The Spacelab Mission Operations Control facility at Marshall replaces the Spacelab payload operations control center in Houston, which was deactivated following the first three Spacelab missions, which were flown in 1983 and 1985.

Spacelab is a unique laboratory facility. Carried in the cargo bay of the Space Shuttle orbiter, it converts the Shuttle in a versatile on-orbit research center.

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For Release:
April 17, 1990

RELEASE NO: 90- 60

MARSHALL SPACE FLIGHT CENTER'S ECONOMIC IMPACT ASSESSED

NASA's Marshall Space Flight Center in Huntsville, Ala., which is observing its 30th anniversary this year, has injected into North Alabama's economy some $3 billion in salaries alone since it was established in 1960.

During its three decades of operation, the Center's budgets have totaled $37 billion and much of that money has been spent in Alabama.

The Marshall Center is one of the major contributors to the economic success currently enjoyed by the Huntsville area. The extent of this impact during the last fiscal year, which began Oct. 1, 1988 and ended Sept. 30, 1989, is shown in an end-of-year economic impact assessment compiled by the Center.

Marshall, one of eleven NASA installations, last year received $3 billion or about 27 percent of the total $10.9 billion NASA budget. The Center contributed $809 million of that sum to Alabama's economy, including $162 million in federal salaries and

-More-

$647 million in locally procured services, prime and subcontractor support and local construction.

At the end of fiscal year 1989, Marshall had 3,758 permanent and temporary civil service employees, including employees at other centers and contractor plants and at the Slidell Computer Complex in Louisiana and the Michoud Assembly Facility near New Orleans, La. The Marshall Center workforce includes 2,724 employees who have earned at least one baccalaureate degree or higher. There are 141 employees with doctorates, 529 with master's degrees and 2,054 with baccalaureate degrees.

Locally employed Marshall Center civil service and contractor personnel and their families comprise about 11 percent of the total Huntsville population. Marshall Center civil service employees had $4.9 million withheld in state income taxes last fiscal year. In addition, they committed $342,272 to charity in last year's local Combined Federal Campaign, an increase of 15 percent over the previous year.

Retired employees of the Center have tended to remain residents of the Huntsville area (1,670 at most recent count) and are contributing more than $33.6 million to the city economy.

NASA's capital investment at Marshall, its component installations in Louisiana and at contractor-operated facilities elsewhere totals more than $1 billion, of which $565 million is on-site at the Center in Huntsville.

During FY89, 352,455 people visited Marshall in various capacities. These included 1,689 educators and students; 5,651 civic, conference and symposia visitors; 1,356 foreign visitors;

-More-

642 media; and 188 senior government leaders. Also, during the same time, 315,004 visited Marshall via the Space and Rocket Center bus tours.

The Center and the nation's universities share a strong mutual interest and bond. In FY89, Marshall awarded 194 research grants totaling $50.4 million to 68 universities in 33 states. In Alabama, 129 grants totaling $11.3 million were given to six universities -- Alabama A&M, Auburn, Tuskegee, the University of Alabama, the University of Alabama in Huntsville and the University of Alabama in Birmingham.

The Marshall Center has a cooperative education program with institutions of higher learning throughout the Southeast region. More than 150 professional co-ops currently participate.

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April 20, 1990

RELEASE: 90-61

EDITORS NOTE: ASTRO-1 T-30 BRIEFINGS SET FOR MAY 2 AT MARSHALL SPACE FLIGHT CENTER

The STS-35/Astro-1 science and mission briefings are scheduled for Wednesday May 2 at NASA's Marshall Space Flight Center in Huntsville, Ala.

The briefings are scheduled to begin at 9 a.m. (CDT). They will include: A briefing on the importance of the Astro-1 mission to NASA's long-term astrophysics program; a STS-35 overview by the flight director; an Astro-1 overview by the mission manager; and an overview on Astro-1 science with briefings by each of the scientists with instruments aboard the Shuttle.

-More-

Also, there will be a discussion of science operations on orbit, and a briefing on the Space Classroom educational program being initiated on the Astro-1 mission.

There also will be a briefing with recommendations on how to best cover the Astro-1 mission.

All briefings will originate from the MSFC TV studio, Building 4207, except for the flight director briefing, which will originate from the Johnson Space Center Building 2 briefing room.

Following the briefings, there will be an opportunity for individual interviews with briefing participants at the Marshall Space Flight Center, and tours of operational areas including the the Spacelab Mission Operations Control facility from which science operations will be directed.

All briefings will be carried live on NASA Select television, available on Satcom F2R, transponder 13 at 3960 MHz. Two-way question and answer capability will be available at NASA centers and at NASA Headquarters.

During the mission, media wishing to focus attention on the Astro science activities are advised to contact the Marshall Media Services Office at 205-544-0034, to arrange for accreditation at the Marshall News Center. Marshall will operate a 24-hour-a-day newsroom during the STS-35 mission and will have Astro scientists and managers available for briefings and interviews throughout the mission.

NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

For Release:

Jim Sahli
Marshall Space Flight Center
Huntsville, Ala.
(Phone: 205/544-0034)

August 13, 1990

RELEASE NO: 90-146

RYAN NAMED DEPUTY DIRECTOR OF STRUCTURES, DYNAMICS LABORATORY AT NASA'S MARSHALL SPACE FLIGHT CENTER

Robert S. Ryan has been appointed deputy director of the Structures and Dynamics Laboratory in the Science and Engineering Directorate at NASA's Marshall Space Flight Center in Huntsville, Ala.

That laboratory plans, conducts, and directs research and development in structures and dynamics for the analysis and design of NASA space and launch vehicles, payloads, and systems to establish environments and specify dynamics-related design criteria.

Ryan joined the Marshall Space Flight Center in 1960 and

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January 1989, he was appointed assistant director of the Structures and Dynamics Laboratory.

Ryan was born and raised in Morgan County. He graduated from the University of North Alabama with a degree in math and science and for eight years was a teacher at Priceville High School. While there, he coached the school's basketball team to two state single A championships.

He has earned two master's degrees, one in education from Peabody College in Nashville and a second in engineering mechanics from the University of Alabama.

Ryan lives in Madison, Ala. with his wife, the former Clara Jean Mathews of Decatur, Ga. They have two sons and six grandchildren.

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NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

For Release

Jim Sahli
Marshall Space Flight Center
Huntsville, Ala.
(Phone: 205/544-0034)

August 20, 1990

RELEASE NO: 90-148

KEY NAMED DEPUTY DIRECTOR OF MATERIALS, PROCESSES LABORATORY

Frank Key has been appointed deputy director of the Materials and Processes Laboratory in the Science and Engineering Directorate at the Marshall Space Flight Center in Huntsville, Ala.

That laboratory has responsibility for materials and processes engineering spanning the disciplines of physical and analytical chemistry, engineering physics, metallurgy, corrosion research, lubrication, process engineering and nonmetallic materials.

Key joined the Marshall Space Flight Center in 1960 and served in progressively responsible positions within the Science and Engineering Directorate, including chief of the Materials Selection and Control Office for seven years. In 1983, he was appointed assistant director of the Materials and Processes

-more-

Laboratory and served in that position until being named deputy director.

Key has received numerous awards including the NASA Exceptional Service Medal in 1988 for his contributions to NASA's Space Shuttle return to flight.

He was born in Birmingham, Ala. In 1956, he graduated from Samford University in Birmingham with a degree in math and chemistry.

Key and his wife, the former Vivian Hawkins of Pine Grove, W. Va., have three sons, one daughter and four grandchildren.

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NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

Dave Drachlis
Marshall Space Flight Center
Huntsville, Ala.
(Phone: 205/544-0034)

For Release
Aug. 24, 1990

RELEASE NO: 90-151

NOTE TO EDITORS/NEWS DIRECTORS

NASA managers have set a target date of Sept. 1, 1990, for the launch of STS-35/Astro-1, a nine-day Spacelab astronomy mission. The launch window for the Space Shuttle Columbia and its astronomy payload opens at 12:17 a.m. CDT.

Astro-1 mission operations will differ from other Shuttle missions, and NASA news operations will be different as well. An Astro-1 news center will be established and staffed around the clock at the Spacelab Mission Operations Control facility at NASA's Marshall Space Flight Center in Huntsville, Ala., where for the first time mission science operations will be controlled. The attached fact sheet provides information on how news media can best cover the science mission.

News media planning to cover the mission from the Marshall news center who desire workspace and telephones, have special requirements, or desire additional information should contact Marshall's Media Services office at (205) 544-0034.

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Coverage of the launch of Columbia and the STS-35 mission will be carried on NASA Select Television, which is available on Satcom F-2R, Transponder 13, C-band, located at 72 degrees west longitude, frequency 3960.0 MHz, vertical polarization, audio monaural 6.8 MHz.

NASA FactSheet

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

Dave Drachlis
Marshall Space Flight Center, Huntsville, Ala.
(Phone: 205/544-0034)

August 23, 1990

HOW TO COVER STS-35 ASTRO-1 SPACELAB

NASA will launch an observatory called Astro-1 aboard the Space Shuttle Columbia in September on a nine-day Spacelab astronomy mission. The mission features three ultraviolet telescopes and an X-ray telescope. They will be used to study a violent, ever-changing universe invisible to the human eye.

Astro-1 will probe far-away places where exploding stars forge the elements used to make new stars, planets and even life itself; where tiny stars exist in which a piece the size of a sugar cube weighs as much as a billion tons; where mysterious objects shine with the brilliance of 10-trillion suns, and where holes in the very fabric of space consume matter and even light.

Astro-1 will be considerably different from other Space Shuttle missions. Therefore, NASA news operations and services will differ significantly from most other Space Shuttle flights.

BACKGROUND

The nine-day STS-35/Astro-1 mission will be a joint effort between controllers and scientists at the Spacelab Mission Operations Control facility at the Marshall Space Flight Center in Huntsville, Ala.; a supporting control facility at the Goddard Space Flight Center in Greenbelt, Md.; and the Mission Control Center at the Johnson Space Center in Houston.

While Mission Control will be responsible for standard Shuttle flight operations, all Astro-1 science operations, which constitute the vast majority of flight activities, will be directed from the new Spacelab Mission Operations Control facility at Marshall.

From the Huntsville facility, controllers and scientists will plan and direct science operations around the clock throughout the mission. They will send commands directly to the spacecraft,

receive and analyze scientific data being transmitted to the ground from the Shuttle, and talk with the science astronauts on an air-to-ground circuit separate from the circuit used by Mission Control to talk with the flight crew. Scientists will work in real time with their counterparts in space to take advantage of astronomical targets of opportunity, replan activities based on observation results, and resolve problems with their instrument hardware if necessary. While most of the Astro-1 activity will occur in Huntsville, commands for one of the instruments, the X-ray telescope, will be sent from the Goddard Space Flight Center under direction of the Goddard science team at Marshall.

Astro-1 science activity begins approximately 3.5 hours after launch when the science astronauts, working with their counterparts in Huntsville, begin activating the four telescopes. Science operations continue around the clock both on the spacecraft and on the ground until the payload is deactivated on the last day of the mission.

During the flight, hundreds of astronomical objects will be studied.

In addition to the science operations, the Astro-1 mission will feature a new NASA education program called Space Classroom. The heart of the program is a science lesson to be taught by members of the crew from orbit. The lesson will be supplemented by explanation and demonstrations from a classroom in the Marshall Center Spacelab Mission Operations Control facility, and students in Huntsville and at the Goddard Space Flight Center will have the opportunity to ask questions of the crew in orbit. Students from schools in the Southeast will participate in a three-day Spacelab astronomy workshop at the Marshall Center. It will include additional classroom instruction, hands-on laboratory activities, and time with science teams in the control center.

Also, Science Astronaut Dr. Ron Parise will talk with amateur radio operators around the world as part of an experiment called SAREX II.

COVERING ASTRO-1 FROM HUNTSVILLE

The Marshall Space Flight Center has prime responsibility for disseminating Astro-1 science mission information. Media desiring to cover the Astro-1 science mission should note that most of that activity will be focused in Huntsville.

While media covering from Huntsville will have access to media services normally available at all NASA mission news centers, access to some significant events and services will be available only at the Marshall Space Flight Center. They include:

- Direct access to Astro-1 mission management, control team members and scientists who are conducting research during the mission.

Access to the Spacelab Mission Operations Control facility during the mission.

Direct access to some real-time data from the spacecraft on instrument status.

Access to middle school students who will be talking with astronauts aboard the Shuttle as part of a new NASA education program called Space Classroom.

Access to Huntsville area amateur radio operators who will attempt to talk with Science Astronaut Dr. Ron Parise as part of the SAREX project.

Access to simulators where the science crew trained for the mission.

Access to a daily release of photos taken of activities in the control center and from spacecraft television transmitted to the ground.

News Center: To accommodate media coverage of the Astro-1 science mission, a full-service news operation will be established at the Marshall Center beginning prior to launch and continuing to operate around the clock throughout the mission.

Facilities: The Astro-1 news center provides media work stations, each equipped with credit-card telephones, and a capability to monitor NASA Select Audio, Mission Audio, and both air/ground circuits. Overhead monitors provide NASA Select television, mission timing, tracking, orbital attitude and experiment status displays.

For media desiring to bring satellite trucks or other mobile facilities, parking and hookups are provided adjacent to the news center. Hookups include telephone, electrical power, as well as selected audio and video feeds.

Staffing: The Marshall Center news center will be staffed around the clock by NASA public affairs officers knowledgeable about the Astro-1 mission, public affairs officers representing each of the instruments aboard the Spacelab mission, and technical experts.

Interviews: An interview desk in the news center will arrange and schedule both face-to-face and telephone interviews with mission participants.

Photo Releases: A photo desk in the news center will provide a daily release of photographs of Huntsville control center activities as well as photographs made from spacecraft television of science activities.

Briefings: Two Astro-1 status briefings originate from the Marshall Center daily throughout the mission. A morning briefing will be conducted by the mission scientist and scientists from each of the experiment teams. An afternoon briefing will be conducted by the mission manager. Additional briefings will be conducted as appropriate.

Mission Data Displays: Media covering from the Marshall news center will have access to mission timing, tracking, orbiter attitude, and experiment status displays.

Visits to Operational Areas: Visits by media to mission operational areas, including the Spacelab Mission Operations Control facility, can be arranged by the news center.

Space Classroom: Media covering from the Marshall Center may cover aspects of student participation in the Space Classroom program and interview participating students. Access to the Space Classroom in the control center during the lesson itself will be available on a limited pool basis.

SAREX II: Media will have an opportunity to cover Marshall Center Amateur Radio Club participation in SAREX II activities in Huntsville.

Status Reports: Written reports on the status of the Astro-1 mission will be issued from the Spacelab Mission Operations Control facility every few hours around the clock. These reports will be available in the news center.

Broadcast News Service: An Astro-1 broadcast news service will be maintained by the Astro-1 news center. It will contain a brief status on the Astro-1 science mission. The broadcast news service can be reached by dialing (205) 544-6397.

Mission Programming: Around-the-clock commentary on the Astro-1 mission will emanate from the Spacelab Mission Operations Control facility and will be integrated into NASA Select television and Mission Audio programming.

Around-the-clock television programming will emanate from the Spacelab Mission Operations Control facility and will be integrated into NASA Select television. An uninterrupted feed of the payload control center television program will be available to media covering from the Marshall Center.

Television coverage emanating from the Marshall Center will include television from the Space Shuttle cabin and payload bay cameras, images from the Astro-1 telescope cameras, television from the Payload Control Room and research areas of the Spacelab Mission Operations Control facility, coverage of daily science and mission management briefings, and special programming.

Special programming includes a half-hour daily summary of Astro-1 activities for the previous 24-hours. The program, called "Today in Space," will originate from the Marshall Center, live on NASA Select at approximately 2:30 p.m. CDT. It will include video highlights as well as comments and discussions by mission participants.

Stand-up Locations: There are a number of locations for television stand-ups for media covering from Marshall, including a mock-up of the aft flight deck of the Shuttle where the astronauts control the Astro-1 telescopes, and a full-scale mock-up of the Space Shuttle launch vehicle. There will also be some opportunities to do stand-ups in viewing areas overlooking the Spacelab control rooms.

Audio Rebroadcast: NASA Select audio is rebroadcast in the Huntsville area at a frequency of 173.025 Mhz.

Accreditation: Prior accreditation is not required for media covering from the Marshall Center. However, media planning to cover from the center should contact the Public Affairs Office at (205) 544-0034 in advance of their arrival to ensure any special requirements are met. Media work space and facilities will be allocated in advance of the mission on a first-come, first-served basis.

COVERING ASTRO-1 FROM KSC

While the Kennedy Space Center, Fla., news center is primarily responsible for disseminating information about the Shuttle countdown and launch, plans are to have public affairs officers knowledgeable about the Astro-1 science mission present at the Kennedy news center through launch. Additionally, some Astro-1 managers and scientists will be at Kennedy Center for a series of briefings on L-1 day. For additional information, media may contact the Public Affairs Office at (407) 867-2468.

COVERING ASTRO-1 FROM JSC

The Johnson Space Center news center has primary responsibility for dissemanating information about STS-35 flight operations. For additional information, media may contact the Public Affairs Office at (713) 483-5111.

COVERING ASTRO-1 FROM GSFC

The Goddard Space Flight Center news center will be staffed by public affairs officers knowledgeable about the Astro-1 mission, and in particular Broad Band X-Ray Telescope (BBXRT) operations. Media will be allowed, by appointment, to conduct interviews outside the BBXRT Payload Operations Control Center. BBXRT

spokespersons will be available for face-to-face or telephone interviews.

Goddard's Amateur Radio Club will participate in the SAREX II experiment and will attempt to talk to Astronaut Dr. Ron Parise. Media are invited to cover this activity from the club's "ham-shack."

At Goddard, 30 students will participate in the "Lesson from Space" from an actual Launch Control Center (LCC), complete with headsets and monitors. Student interviews will be allowed in the LCC before and after the actual lessons. Tapes of Goddard's video-feed to MSFC during the lesson will be made available to the press following the lesson.

For more information, media may call the Office of Public Affairs at (301) 286-8955.

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NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

For Release

Jim Sahli
Marshall Space Flight Center
Huntsville, Ala.
(Phone: 205-544-6528)

Nov. 9, 1990

RELEASE NO: 90-171

NOTE TO LOCAL/REGIONAL NEWS MEDIA: Marshall Space Flight Center Changes Parking Policy For Building 4200

News media who visit Building 4200 at the Marshall Space Flight Center in Huntsville, Ala. should park in the visitor parking lot to the south of the traffic circle, starting today.

Marshall officials said that in the interest of safety, neither government nor private cars will be permitted to park in the traffic circle. We are making you aware of this change in policy, so that you do not inadvertently park in front of the building and receive a ticket from a security officer. We solicit your cooperation in this matter.

News media who have further questions about this policy may call the Marshall Media Services Office at 205-544-6528.

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NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

For Release

Jim Sahli
Marshall Space Flight Center
Huntsville, Ala.
(Phone: 205/544-0034)

Nov. 16, 1990

RELEASE NO: 90-171

MARSHALL CENTER COMBINED FEDERAL CAMPAIGN NETS RECORD CONTRIBUTION

Contributions by local NASA employees to the federal government's 1990 Combined Federal Campaign set a record high and topped last year's total contribution by $10,000.

Some 3,100 NASA employees at the Marshall Space Flight Center in Huntsville, Ala., pledged $351,225, which will be distributed to more than 420 local and national agencies. The average contribution was more than $113 per employee, an increase of $5 over last year's average gift. Approximately $250,000--72 percent of the total donation--will go to Huntsville-area recipient agencies.

"We are excited that we were able to put so much back into the community to help the needy," said Dr. Gabe Wallace, the Combined Federal Campaign executive chairman for the Marshall Center. "Events like the tornado this past year heightened our awareness of the pressing needs of others, which probably caused our giving to increase."

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"However, Marshall people have always strongly supported the Combined Federal Campaign as an excellent way to help those in need, not only in our community, but around the world. This year was no exception," said Dr. Wallace.

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NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

For Release

Jim Sahli/Dave Drachlis
Marshall Space Flight Center
Huntsville, Ala.
(Phone: 205/544-0034)

Nov. 16, 1990

RELEASE NO: 90-174

NOTE TO EDITORS/NEWS DIRECTORS

A nine-day Spacelab astronomy mission planned for early December is scheduled to be the next Space Shuttle mission. The STS-35/Astro-1 mission will be flown on the Space Shuttle Columbia and will be the 38th Shuttle flight.

Astro-1 mission operations will differ from other Shuttle missions, and NASA news operations will be different as well.

An Astro-1 news center will be established and staffed around the clock at the Spacelab Mission Operations Control facility at NASA's Marshall Space Flight Center in Huntsville, Ala., where for the first time mission science operations will be controlled. The attached fact sheet provides information on how news media can best cover the science mission.

News media planning to cover the mission from the Marshall news center who desire workspace and telephones, have special requirements, or desire additional information should contact Marshall's Media Services office at (205) 544-0034.

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Enclosed is a STS-35 Press Vehicle Pass which will permit you to enter the U. S. Army's Redstone Arsenal gates 24 hours a day. It is valid three days before the Astro-1 launch through mission landing day. (Marshall Space Flight Center is located on the Redstone Arsenal.)

Coverage of the launch of Columbia and the STS-35 mission will be carried on NASA Select Television, which is available on Satcom F-2R, Transponder 13, C-band, located at 72 degrees west longitude, frequency 3960.0 MHz, vertical polarization, audio monaural 6.8 MHz.

NASA FactSheet

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

Dave Drachlis
Marshall Space Flight Center,
Huntsville, Ala.
(Phone: 205/544-0034)

Nov. 16, 1990

HOW TO COVER STS-35 ASTRO-1 SPACELAB

NASA will launch an observatory called Astro-1 aboard the Space Shuttle Columbia in December on a nine-day Spacelab astronomy mission. The mission features three ultraviolet telescopes and an X-ray telescope. They will be used to study a violent, ever-changing universe invisible to the human eye.

Astro-1 will probe far-away places where exploding stars forge the elements used to make new stars, planets and even life itself; where tiny stars exist in which a piece the size of a sugar cube weighs as much as a billion tons; where mysterious objects shine with the brilliance of 10-trillion suns, and where holes in the very fabric of space consume matter and even light.

Astro-1 will be considerably different from other Space Shuttle missions. Therefore, NASA news operations and services will differ significantly from most other Space Shuttle flights.

BACKGROUND

The nine-day STS-35/Astro-1 mission will be a joint effort between controllers and scientists at the Spacelab Mission Operations Control facility at the Marshall Space Flight Center in Huntsville, Ala.; a supporting control facility at the Goddard Space Flight Center in Greenbelt, Md.; and the Mission Control Center at the Johnson Space Center in Houston.

While Mission Control will be responsible for standard Shuttle flight operations, all Astro-1 science operations, which constitute the vast majority of flight activities, will be directed from the new Spacelab Mission Operations Control facility at Marshall.

From the Huntsville facility, controllers and scientists will plan and direct science operations around the clock throughout the mission. They will send commands directly to the spacecraft, receive and analyze scientific data being transmitted to the ground from the Shuttle, and talk with the science astronauts on an air-to-ground circuit separate from the circuit used by Mission Control to talk with the flight crew. Scientists will work in real time with their counterparts in space to take advantage of astronomical targets of opportunity, replan activities based on observation results, and resolve problems with their instrument hardware if necessary. While most of the Astro-1 activity will occur in Huntsville, commands for one of the instruments, the X-ray telescope, will be sent from the Goddard Space Flight Center under direction of the Goddard science team at Marshall.

Astro-1 science activity begins approximately 3.5 hours after launch when the science astronauts, working with their counterparts in Huntsville, begin activating the four telescopes. Science operations continue around the clock both on the spacecraft and on the ground until the payload is deactivated on the last day of the mission.

During the flight, hundreds of astronomical objects will be studied.

In addition to the science operations, the Astro-1 mission will feature a new NASA education program called Space Classroom. The heart of the program is a science lesson to be taught by members of the crew from orbit. The lesson will be supplemented by explanation and demonstrations from a classroom in the Marshall Center Spacelab Mission Operations Control facility, and students in Huntsville and at the Goddard Space Flight Center will have the opportunity to ask questions of the crew in orbit. Students from schools in the Southeast will participate in a three-day Spacelab astronomy workshop at the Marshall Center. It will include additional classroom instruction, hands-on laboratory activities, and time with science teams in the control center.

Also, Science Astronaut Dr. Ron Parise will talk with amateur radio operators around the world as part of an experiment called SAREX II.

COVERING ASTRO-1 FROM HUNTSVILLE

The Marshall Space Flight Center has prime responsibility for disseminating Astro-1 science mission information. Media desiring to cover the Astro-1 science mission should note that most of that activity will be focused in Huntsville.

While media covering from Huntsville will have access to media services normally available at all NASA mission news centers, access to some significant events and services will be available only at the Marshall Space Flight Center. They include:

Direct access to Astro-1 mission management, control team members and scientists who are conducting research during the mission.

Access to the Spacelab Mission Operations Control facility during the mission.

Direct access to some real-time data from the spacecraft on instrument status.

Access to middle school students who will be talking with astronauts aboard the Shuttle as part of a new NASA education program called Space Classroom.

Access to Huntsville area amateur radio operators who will attempt to talk with Science Astronaut Dr. Ron Parise as part of the SAREX project.

Access to simulators where the science crew trained for the mission.

Access to a daily release of photos taken of activities in the control center and from spacecraft television transmitted to the ground.

News Center: To accommodate media coverage of the Astro-1 science mission, a full-service news operation will be established at the Marshall Center beginning prior to launch and continuing to operate around the clock throughout the mission.

Facilities: The Astro-1 news center provides media work stations, each equipped with credit-card telephones, and a capability to monitor NASA Select Audio, Mission Audio, and both air/ground circuits. Overhead monitors provide NASA Select television, mission timing, tracking, orbital attitude and experiment status displays.

For media desiring to bring satellite trucks or other mobile facilities, parking and hookups are provided adjacent to the news center. Hookups include telephone, electrical power, as well as selected audio and video feeds.

Staffing: The Marshall Center news center will be staffed around the clock by NASA public affairs officers knowledgeable about the Astro-1 mission, public affairs officers representing each of the instruments aboard the Spacelab mission, and technical experts.

Interviews: An interview desk in the news center will arrange and schedule both face-to-face and telephone interviews with mission participants.

Photo Releases: A photo desk in the news center will provide a daily release of photographs of Huntsville control center activities as well as photographs made from spacecraft television of science activities.

Briefings: Two Astro-1 status briefings originate from the Marshall Center daily throughout the mission. A morning briefing will be conducted by the mission scientist and scientists from each of the experiment teams. An afternoon briefing will be conducted by the mission manager. Additional briefings will be conducted as appropriate.

Mission Data Displays: Media covering from the Marshall news center will have access to mission timing, tracking, orbiter attitude, and experiment status displays.

Visits to Operational Areas: Visits by media to mission operational areas, including the Spacelab Mission Operations Control facility, can be arranged by the news center.

Space Classroom: Media covering from the Marshall Center may cover aspects of student participation in the Space Classroom program and interview participating students. Access to the Space Classroom in the control center during the lesson itself will be available on a limited pool basis.

SAREX II: Media will have an opportunity to cover Marshall Center Amateur Radio Club participation in SAREX II activities in Huntsville.

Status Reports: Written reports on the status of the Astro-1 mission will be issued from the Spacelab Mission Operations Control facility every few hours around the clock. These reports will be available in the news center.

Broadcast News Service: An Astro-1 broadcast news service will be maintained by the Astro-1 news center. It will contain a brief status on the Astro-1 science mission. The broadcast news service can be reached by dialing (205) 544-6397.

Mission Programming: Around-the-clock commentary on the Astro-1 mission will emanate from the Spacelab Mission Operations Control facility and will be integrated into NASA Select television and Mission Audio programming.

Around-the-clock television programming will emanate from the Spacelab Mission Operations Control facility and will be integrated into NASA Select television. An uninterrupted feed of the payload control center television program will be available to media covering from the Marshall Center.

Television coverage emanating from the Marshall Center will include television from the Space Shuttle cabin and payload bay cameras, images from the Astro-1 telescope cameras, television from the Payload Control Room and research areas of the Spacelab Mission Operations Control facility, coverage of daily science and mission management briefings, and special programming.

Special programming includes a half-hour daily summary of Astro-1 activities for the previous 24-hours. The program, called "Today in Space," will originate from the Marshall Center, live on NASA Select at approximately 2:30 p.m. CDT. It will include video highlights as well as comments and discussions by mission participants.

Stand-up Locations: There are a number of locations for television stand-ups for media covering from Marshall, including a mock-up of the aft flight deck of the Shuttle where the astronauts control the Astro-1 telescopes, and a full-scale mock-up of the Space Shuttle launch vehicle. There will also be some opportunities to do stand-ups in viewing areas overlooking the Spacelab control rooms.

Audio Rebroadcast: NASA Select audio is rebroadcast in the Huntsville area at a frequency of 173.025 Mhz.

Accreditation: Prior accreditation is not required for media covering from the Marshall Center. However, media planning to cover from the center should contact the Public Affairs Office at (205) 544-0034 in advance of their arrival to ensure any special requirements are met. Media work space and facilities will be allocated in advance of the mission on a first-come, first-served basis.

COVERING ASTRO-1 FROM KSC

While the Kennedy Space Center, Fla., news center is primarily responsible for disseminating information about the Shuttle countdown and launch, plans are to have public affairs officers knowledgeable about the Astro-1 science mission present at the Kennedy news center through launch. Additionally, some Astro-1 managers and scientists will be at Kennedy Center for a series of briefings on L-1 day. For additional information, media may contact the Public Affairs Office at (407) 867-2468.

COVERING ASTRO-1 FROM JSC

The Johnson Space Center news center has primary responsibility for dissemanating information about STS-35 flight operations. For additional information, media may contact the Public Affairs Office at (713) 483-5111.

COVERING ASTRO-1 FROM GSFC

The Goddard Space Flight Center news center will be staffed by public affairs officers knowledgeable about the Astro-1 mission, and in particular Broad Band X-Ray Telescope (BBXRT) operations. Media will be allowed, by appointment, to conduct interviews outside the BBXRT Payload Operations Control Center. BBXRT spokespersons will be available for face-to-face or telephone interviews.

Goddard's Amateur Radio Club will participate in the SAREX II experiment and will attempt to talk to Astronaut Dr. Ron Parise. Media are invited to cover this activity from the club's "ham-shack."

At Goddard, 30 students will participate in the "Lesson from Space" from an actual Launch Control Center (LCC), complete with headsets and monitors. Student interviews will be allowed in the LCC before and after the actual lessons. Tapes of Goddard's video-feed to MSFC during the lesson will be made available to the press following the lesson.

For more information, media may call the Office of Public Affairs at (301) 286-8955.

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NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

Dominic A. Amatore
Marshall Space Flight Center
Huntsville, Ala.
(Phone: 205/544-0034)

For Release:
January 9, 1991

RELEASE NO: 91-4

NASA CANCELS DEVELOPMENT OF INTEGRAL THROAT ENTRANCE
FOR SHUTTLE ADVANCED SOLID ROCKET MOTOR NOZZLE

NASA today announced the cancellation of development of an Integral Throat Entrance (ITE) for use on the Space Shuttle Advanced Solid Rocket Motor (ASRM) nozzle in favor of an ablative throat design, similar to the type currently used on the Shuttle's Redesigned Solid Rocket Motor (RSRM).

This ITE is a form of nozzle liner which resists the very high-temperature gases in the rocket motor's exhaust.

Textron, Inc., Lowell, Mass. was responsible for developing and manufacturing the ITE under contract to Thiokol Corp. Development of this new ITE was undertaken with the desire to improve performance and reliability but recent data showed that development of this large scale ITE had risks from a technical, cost and performance standpoint.

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Marshall Space Flight Center in Huntsville, Ala. manages the Advanced Solid Rocket Motor for NASA. Lockheed Missiles & Space Co., Sunnyvale, Calif., is the ASRM prime contractor. Aerojet ASRM Division is Lockheed's principal subcontractor for motor design and plant operation. Nozzle production is being done by Thiokol Corp. under a subcontract to Aerojet.

NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

For Release:

Jim Sahli
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Sarah Keegan
Headquarters,
Washington, D. C.
(Phone:202/453-2754)

Feb. 21, 1991

RELEASE: 91-24

SCIENTISTS FIND RARE ISOTOPE ON NASA SPACECRAFT

Scientists from several U. S. government and university laboratories will report today finding the rare atmospheric isotope Beryllium-7 present on the surface of NASA's Long Duration Exposure Facility (LDEF).

The isotope Beryllium-7 is radioactive and produced naturally by cosmic ray reactions in the Earth's atmosphere. Although very rare, the isotope is detectable by modern nuclear instrumentation and has been studied in the past as a means of tracing the distribution and transport of atmospheric gases in the lower atmosphere, said Dr. Gerald J. Fishman of NASA's Marshall Space Flight Center, Huntsville, Ala.

"The finding is thought to be significant from at least two different aspects," said Fishman. "First, it is known that the

-More-

isotope is mainly produced at much lower altitudes in the atmosphere than where the LDEF was orbiting. The detection and measurements show that some, as yet undetermined, process efficiently carries it to high altitudes.

"Additional and more detailed measurements of this type may lead to a better understanding of the movement of rare atmospheric components over the globe at high altitudes," he said.

"Secondly, prior to this finding, there was only one atmospheric gas known to strongly interact with orbiting spacecraft. That gas, atomic oxygen, has been found to be very significant, leading to the degradation of various spacecraft surfaces. The detection of Beryllium-7 on the LDEF surface will allow scientists to study in greater detail the interaction of gases with spacecraft in low Earth orbit," said Fishman.

"A team of scientists found the isotope on the LDEF during measurements at the Kennedy Space Center shortly after its return. At approximately the same time," said Fishman, "researchers working with removed external spacecraft components at the Marshall Space Flight Center and the University of Alabama in Huntsville, confirmed the Beryllium-7 presence and showed that it was confined to a very thin layer -- the surfaces on the leading edge of the LDEF." The NASA scientist is part of a radiation group investigating materials and radiation data returned from LDEF.

-More-

The finding involved the collaboration of scientists from the Marshall Space Flight Center; Universities Space Research Association, Huntsville; University of Alabama in Huntsville; Naval Research Laboratory, Washington, D. C.; University of Florida; Institute for Space Science and Technology, Gainesville, Fla; and Mississippi State University.

The Long Duration Exposure Facility was returned from space by the Space Shuttle Columbia in January 1990 after nearly six years in Earth orbit.

LDEF is a 12-sided cylindrical structure 30 feet long and 14 feet in diameter. The LDEF spacecraft was designed to test the performance of spacecraft materials, components and systems that have been exposed to micrometeoroids, space debris, space vacuum, atomic oxygen, solar ultraviolet and space radiation for an extended period of time.

LDEF carried 57 experiments and involved participation of several hundred scientists and engineers in the data analysis. The Long Duration Exposure Facility program is managed by NASA's Langley Research Center, Hampton, Va.

This first observation of the isotope on the surface of an orbiting spacecraft was reported in the British scientific journal Nature today.

NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

For Release:

Jim Sahli
Marshall Space Flight Center
Huntsville, Ala.
(Phone: 205/544-0034)

April 16, 1991

RELEASE NO: 91-42

NOTE TO EDITORS: SPACE SHUTTLE SET FOR LAUNCH APRIL 23

The 40th mission of NASA's Space Shuttle, designated STS-39, is scheduled for launch on April 23 from the Kennedy Space Center, Fla. The launch window that day extends from 6:05 a.m. to 8:35 a.m. CDT.

Two primary payloads will be carried aboard: Air Force Program 675 (AFP-675) and the Strategic Defense Initiative Organization's (SDIO) Infrared Background Signature Survey (IBSS).

For those media desiring to cover STS-39 from the Marshall Center, the Public Affairs Press Room, room 108B, building 4200, will operate weekdays from 8 a.m. to 5:30 p.m. Monday through Friday. Press Room hours will be extended or the room will be reopened as necessary to meet any special requirements.

When the Press Room is closed, a Public Affairs Officer will be reachable by calling (205) 544-1771 and asking the operator to connect you with a PAO.

NASA Select Television coverage of the STS-39 mission will be

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available prior to and throughout the mission. This coverage will be carried on RCA Satcom F-2R, Transponder 13, located at 72 degrees west longitude. Media may use the video directly from the satellite, or may obtain dubs by going to the Marshall Center communications facility in Building 4207. Prior to doing so, media should call NASA's television operations at 544-6158 or Marshall Network Control at 544-1771.

Media in the Huntsville area will be able to receive air-to-ground communications and commentary throughout the mission on 173.075 mhz.

A STS-39 vehicle pass is enclosed so that you may enter the Redstone gates more easily during the mission.

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NASA Fact Sheet

National Aeronautics and
Space Administration

Marshall Space Flight Center
Huntsville, Alabama 35812

Jim Sahli
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May 1991

Payload Crew Training Complex Used for Spacelab Experiment Training

Space Shuttle crew members train regularly in a special mission simulation facility at the Marshall Space Flight Center in Huntsville, Ala., in preparation to operate experiments on upcoming missions.

The Payload Crew Training Complex at the Center is used to train science crews for Marshall-managed missions involving Spacelab --a reuseable scientific research laboratory that sits in the Space Shuttle's cargo bay, converting it into a short-stay space station. The complex has also been used to familiarize crew members with the hardware and procedures involved in conducting Shuttle middeck experiments.

Both mission specialists and payload specialists train at the facility. Mission specialists are astronauts--members of the career astronaut corps assigned to the Johnson Space Center in Houston. They operate orbiter and Spacelab systems, perform extravehicular activities, and also conduct scientific experiments during Spacelab missions. Payload specialists are non-career astronauts drawn from the scientific community to work directly with the experiments aboard a particular Spacelab mission.

Facilities

The Payload Crew Training Complex houses an orbiter crew compartment mockup, which includes an aft flight deck and the middeck. The facility also includes hi-fidelity mockups of Spacelab modules and pallets configured to represent upcoming missions.

The heart and soul of the Payload Crew Training Complex is the software for the computer complex. Teams of engineers, technicians and computer scientists in a training control room simulate realistic conditions for crews inside the modules or in the aft flight deck, where Spacelab crews work during pallet-only missions. The teams simulate what the crew will encounter in space, including possible problems. Technicians take the crew through activation of the payload , a "mission slice"--a portion of time drawn from the actual flight schedule--and deactivation of the payloads.

Simulations

During major mission simulations, science crew members in the Payload Crew Training Complex mockups are linked to: scientists and engineers in the Marshall Space Flight Center Spacelab Mission Operations Control facility, flight controllers in the Johnson Space Center Mission Control Center and other flight crew members in orbiter simulators at the Johnson Space Center.

The entire Payload Crew Training Complex is 200 feet long and 80 feet wide. It contains a high-bay area, where the mockups are located; the Terminal Control Room, work stations, classroom/conference rooms, general office space, crew offices, an electronics shop and a construction shop. About 60 engineers, technicians, computer scientists and mathematicians work at the training complex. The facility is part of the Marshall Center's Mission Operations Laboratory.

NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
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For Release:

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May 13, 1991

RELEASE NO: 91-69

NOTE TO EDITORS/NEWS DIRECTORS: SPACELAB LIFE SCIENCES-1 MISSION NEWSCENTER TO BE OPERATED AT THE MARSHALL SPACE FLIGHT CENTER

NASA managers meeting at the Kennedy Space Center in Florida today set Wednesday, May 22, as the launch date for the Space Shuttle Columbia to embark upon mission STS-40 carrying the Spacelab Life Sciences payload. The launch is scheduled for 7 a.m. (CDT).

The nine-day flight will be the first Spacelab mission dedicated to life sciences research, and will be managed by NASA's Johnson Space Center, Houston. Johnson Space Center personnel will direct Spacelab Science Activities from the Spacelab Mission Operations Control facility at the Marshall Space Flight Center in Huntsville, Ala.

A SLS-1 mission newscenter will be operated at the Marshall Center in Trailer-254, adjacent to the Spacelab Mission Operations Control facility. The newcenter hours will be 6 a.m. to 6:30 p.m. (CDT) each day of the mission. The newscenter telephone number will be 205-544-6381.

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An STS-40 vehicle pass is enclosed so that you may enter the Redstone Arsenal gates more easily during the mission.

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NASA Fact Sheet

National Aeronautics and
Space Administration

Marshall Space Flight Center
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Jim Sahli
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July 1991

Spacelab Mission Operations Control, Huntsville

All NASA Spacelab science missions are controlled from the agency's Spacelab Mission Operations Control facility at the Marshall Space Flight Center in Huntsville, Alabama.

The Spacelab Mission Operations Control team supports the science astronauts in much the same way that the Mission Control Center in Houston supports the Space Shuttle flight crew. Teams of flight controllers and researchers at the Huntsville facility direct all NASA science operations, send commands directly to the spacecraft, receive and analyze data from experiments on board the vehicle, adjust mission schedules to take advantage of unexpected science opportunities or unexpected results, and work with crew members to resolve problems with their experiments.

There are two air/ground communications channels used between a spacecraft and ground control during Spacelab missions. One is dedicated to communications between the Spacelab Mission Operations Control facility and the science crew aboard the Space Shuttle. The other is used by Shuttle Mission Control in Houston to talk with the pilots and mission specialists about Shuttle flight matters and Spacelab system issues.

"Huntsville" is the call sign used by astronauts in space to address the control team at the facility.

Spacelab science operations are a cooperative effort between the science astronaut crew in orbit and their colleagues in the Spacelab Mission Operations Control facility. Though the crew and the instrument science teams will be separated by many miles, they interact with one another to evaluate observations and solve problems in much the same way as they would when working side by side in a ground-based laboratory.

The Spacelab Mission Operations Control team is under the overall direction of the Spacelab mission manager. His office is responsible for design and integration of the mission, for making sure that the mission accomplishes the goals set by the scientists who have experiments on the flight, and that the requirements of the scientific payload match the Shuttle/Spacelab resources. The management group coordinates activities with other NASA organizations involved in preparing the Shuttle for launch and performing flight operations.

The Spacelab Mission Operations Control facility is located on two floors of Building 4663 at the Marshall Center. Most of the action is centered in two work areas: the payload control area on the upper floor, from which the overall payload is monitored and controlled; and the science operations area on the ground level, where teams of scientists monitor their instruments and direct experiment activities.

The **payload control area** is the hub for payload operations. Communication with the crew, on-orbit and ground computer systems monitoring, science activities, and even television camera opera-

(Continued on next page)

tions are marshalled from work stations in the control room. Console operators in this area are referred to as the cadre. This group is made up of three teams under the leadership of the payload operations director.

The **operations control team** is responsible for real-time payload control. They make sure that the pre-planned operations schedule is being followed and send commands to the instruments and instructions to the crew. Designated team members stay in voice contact with the on-board science crew.

The **data management team** ensures that the science data needed from the payload is scheduled and received properly. Their responsibilities range from telling the on-board computer when to send down the information it has been storing to scheduling TV transmissions from orbit.

The **payload activity planning team** is in charge of replanning all payload activities when anything from unexpected science opportunities to equipment problems demands a change. After a science operations planning group makes rescheduling decisions for upcoming shifts, the planning team works out the many adjustments that will allow those changes to be accomplished.

The cadre also includes a mission scientist, who leads the science operations planning group and acts as a liaison between the cadre and the teams of scientists; an alternate payload specialist, a backup crew member who helps with air-to-ground communications and assists the mission scientist; and a public affairs commentator and television producer.

The **science operations area** on the ground floor of the Spacelab Mission Operations Control facility is staffed by teams of scientists and engineers responsible for the instruments/experiments on the mission.

The teams monitor the data flowing back from each instrument/experiment, evaluate its overall performance, and assess and analyze the science information revealed by the data. It is even possible for the researcher to talk directly with the crew member operating his or her instrument/experiment, if circumstances demand personal attention. In some cases teams can send commands directly to their experiments aboard the spacecraft.

Engineers on the science teams provide inputs on instrument performance and if necessary recommend alternate methods to maintain optimal performance. Scientists in each group evaluate the quality of data in light of their scientific objectives. They may also conduct a preliminary analysis of their science data, though a complete study may take months or even years.

Spacelab Mission Control Position Descriptions

Payload Operations Director (POD) — The payload operations director is the leader of the cadre teams. The director approves any changes to payload operations during the mission and serves as prime point of contact with Houston Mission Control. An assistant payload operations director works alongside the director during the mission.

Before the mission, the payload operations director leads the payload operations team and crew as they prepare for the mission through training, science and engineering activities, mission design, and documentation. The payload operations director reports to the payload mission manager.

Mission Scientist (MSCI) — The mission scientist leads the operations science planning group in mission science replanning, approves science changes, and resolves conflicting requirements. An assistant sits alongside the mission scientist during the mission. Before the mission, the mission scientist's role is to lead the investigator's working group in mission-science planning and to assist in training the principal investigators in payload control area procedures.

Alternate Payload Specialist (APS) — The alternate payload specialist is an additional representative chosen by the science group as a crew member. This individual completes all flight training and serves as a backup for the payload specialists scheduled to work in orbit. During the mission, the alternate payload specialist is one of the people who communicates directly with the science crew. This payload specialist also assists the mission scientist and payloads team as necessary and participates in the science operations planning group.

(Continued on next page)

Operations Control Team

Operations Controller (OC) — The operations controller leads his/her team in ensuring that the planned mission timeline is carried out. The controller coordinates short-term operations changes and leads in the resolution of on-board payload malfunctions.

Prior to the mission, the controller's team is responsible for preparing the payload data files and computer memory data sets, as well as familiarizing the principal investigator teams with the payload operations control procedures.

Crew Interface Coordinator (CIC) — The crew interface coordinator is the member of the operations controller's team who talks with the science crew in orbit via the Spacelab Mission Operations Control facility's direct air-to-ground communications loop. The crew interface coordinator is the control group's link with the crew for resolving problems as they arise. This individual also coordinates communication between the crew and the science teams in the science operations area. Prior to the mission, the crew interface coordinator consults with Mission Control in Houston on guidelines for air-to-ground conversations and trains the cadre on these procedures.

Crew Procedures Engineer (CPE) — The crew procedures engineer prepares step-by-step procedures for the payload crew prior to the mission, then maintains and updates the payload flight data file as the mission is in progress.

Payload Command Controller (PAYCOM) — The payload command controller manages the schedule for sending commands up to Spacelab, including enabling and disabling the command system. Prior to the mission, this operations control team member assists in command training.

Payload Systems Engineer (PSE) — The payload systems engineer is the focal point for resolving issues that arise involving the Spacelab experiment systems, and was responsible for preparing the payload systems handbook and other documentation prior to the mission.

Mass Memory Unit Update Manager (MUM) — While Spacelab is in orbit, the mass memory unit update manager performs mass memory unit updates and experiment commanding, resulting from changes in the mission timeline. This control team member prepares Spacelab commands before the mission, including verifying the database, and preparing and updating the command displays in the control room.

Experiment Computer Operator (ECO) — This operator assists the mass memory unit update manager in Spacelab command preparation and replanning and provides reports to the cadre on replanning, including the command timeline. The experiment computer operator is the operations team's liaison with the payload activities team.

Payload Activity Team

Payload Activity Planner (PAP) — The payload activity planner leads a team in designing the mission prior to the flight, then altering those plans as required during the mission to accommodate changes requested by the science operations planning group. The payload activities planner also assists the operations controller, and is the prime contact with the flight activities and flight dynamics officers in Houston.

Timeline Engineer (TLE) — During the mission, the timeline engineer updates mission timelines to reflect all payload activity changes as a result of anomalies or changes in requirements. During mission preparation, the timeline engineer was charged with assisting the payload activity planner in developing mission timelines and coordinating modifications to those timelines with the principal investigators of each of the science teams.

Orbital Analysis Engineer (OAE) — In the months before a mission begins, the orbital analysis engineer develops orbit parameters and attitude timelines. The analyst also predicts experiment observation opportunities and satellite communication coverage. After a mission begins, the analyst is responsible for replanning orbiter attitudes and experiment pointing operations and for generating all of the orbital trajectory, orbiter attitude, and experiment pointing data required for replanning the mission and monitoring its execution.

(Continued on next page)

Data Management Team

Data Management Coordinator (DMC) — The data management coordinator manages the payload operations control center data systems to ensure that the maximum science data possible is received, preserved, and distributed. The coordinator is the prime contact with Mission Control in Houston on all matters dealing with payload data management. Before the mission, the data management coordinator is the payload control center's lead representative for coordinating the communications network resources required to accommodate the data flow activities scheduled for the mission.

Data Flow Analyst (DFA) — The data flow analyst processes payload data requests, assists the data coordinator in implementing short-term changes, and generally manages the data system services.

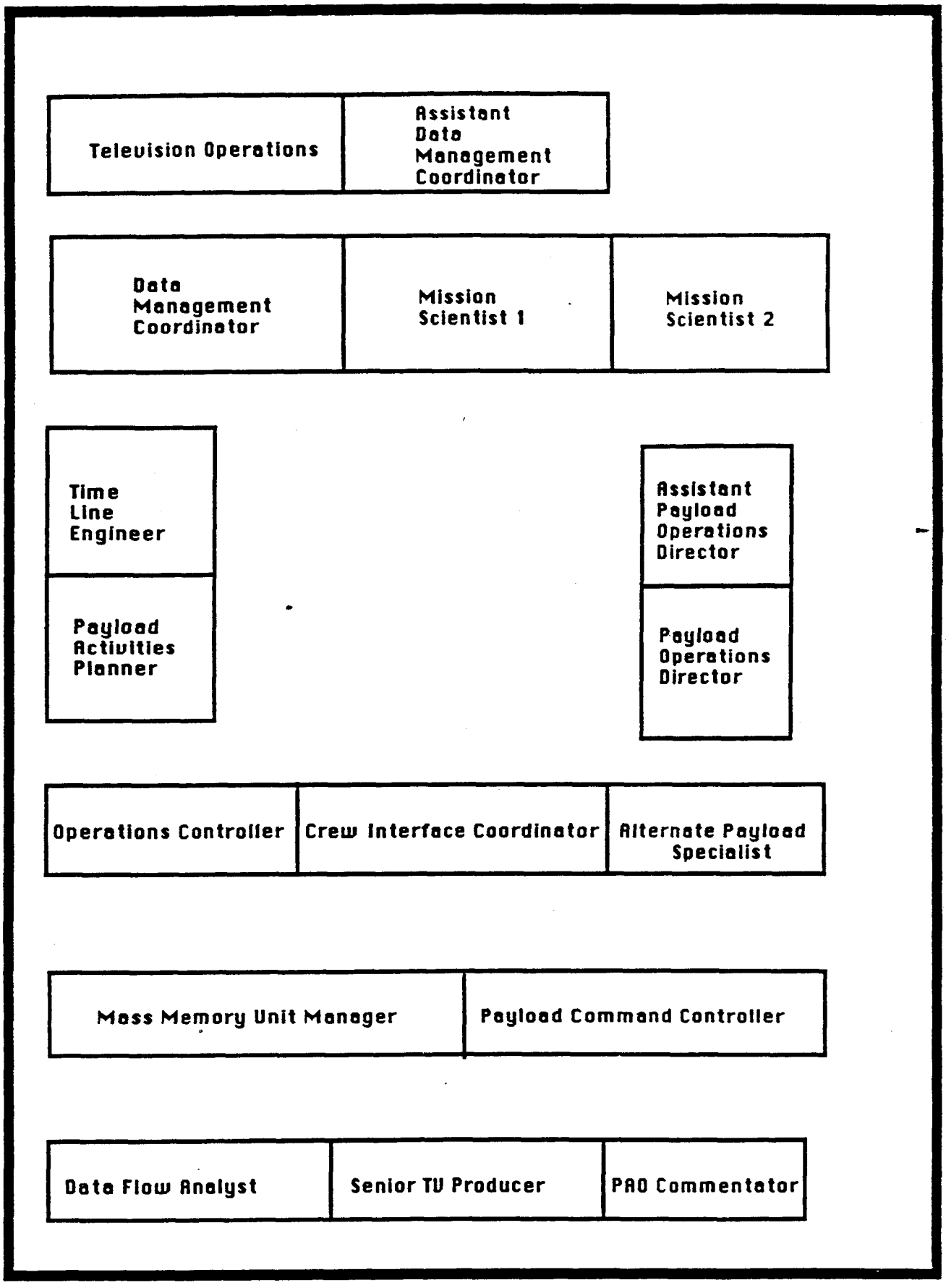
Data Replanner (DREP) — The data replanner is the data management team's liaison with the payload activity team. This individual assists the data management coordinator during the mission to replan data flow as demanded by changes to the activity timeline.

Television Operations (TV OPS) — This member of the data management coordinator's team coordinates payload uses of cameras on board the Shuttle and assists in television and photography planning.

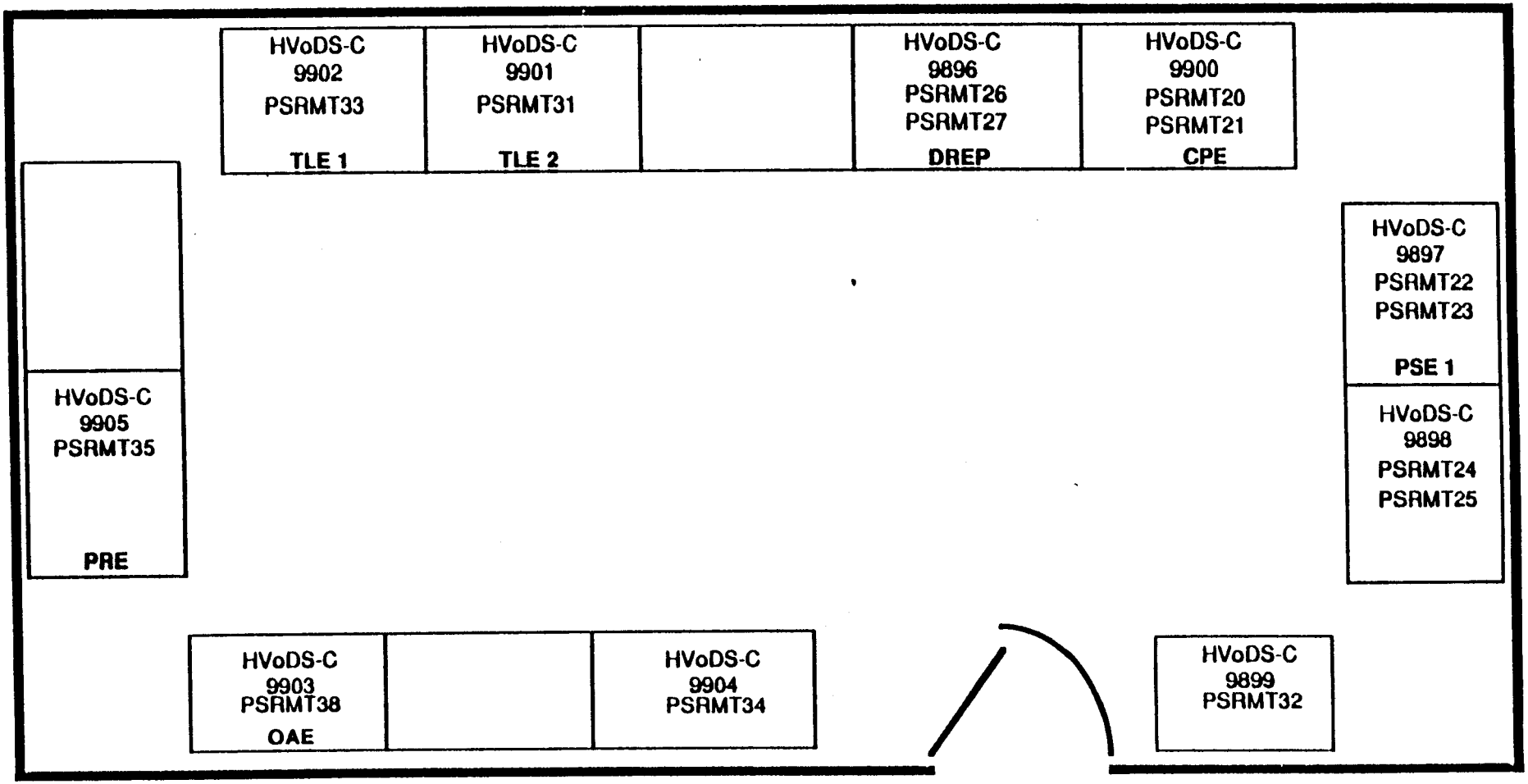
Public Affairs Team

Public Affairs Commentator — This public affairs officer provides commentary on science crew and payload operations control center activities for broadcast on NASA Select Television and Mission Audio.

Public Affairs Television Producer -- This producer is responsible for integrating video from the Spacelab on orbit with scenes from payload ground control areas for release on NASA Select Television.



M-Wing Payload Control Room



Payload Support Room (PSR)
Room M201

TYPICAL **SCIENCE OPERATIONS ROOM**

NASA—MSFC

NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
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Jerry Berg
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For Release:
July 12, 1991

RELEASE NO: 91-101

NOTE TO EDITORS: ATLANTIS LAUNCH SET FOR JULY 23

NASA managers today announced July 23, 1991, as the launch date for the next flight of the Space Shuttle. The STS-43 mission will see the Space Shuttle Atlantis and its crew of five astronauts conduct a mission highlighted by the deployment of the fifth Tracking and Data Relay Satellite (TDRS-E).

The launch window on July 23rd opens at 9:54 a.m. CDT. The flight, which is a little less than 9 days in duration, is scheduled to land on Aug. 1st at either Kennedy Space Center, Fla. or Dryden Flight Research Facility, Edwards, Calif., depending on weather conditions at those sites.

For those media desiring to cover STS-43 from the Marshall Space Flight Center, the Public Affairs Press Room, room 108B in Building 4200, will operate weekdays from 8 a.m. to 5:30 p.m. Monday through Friday. Press Room hours will be extended, or the room will be reopened, if necessary to meet any special requirements.

When the Press Room is closed, a Public Affairs Officer will be reachable by calling (205) 544-1771 and asking the operator to connect you with a PAO.

NASA Select Television coverage of the STS-43 mission will be available prior to and throughout the mission. Coverage will be carried on RCA Satcom F-2R, Transponder 13, located at 72 degrees west longitude. Media may use the video directly from the satellite, or may obtain dubs by going to the Marshall Center communications facility in Building 4207. Prior to going to the facility, media should call NASA's television operations at 544-6158 or Marshall Network Control at 544-1771.

Media in the Huntsville area may listen to air-to-ground communications and commentary throughout the mission on 173.075 mhz.

Enclosed is a copy of the STS-43 press kit, as well as a vehicle pass so that you may enter the Redstone gates more easily during the mission.

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NASA News

National Aeronautics and
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For Release:

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Sept. 3, 1991

RELEASE NO: 91-158

NOTE TO EDITORS/NEWS DIRECTORS:

NASA managers have set Thursday, September 12 as the launch date for the Space Shuttle Discovery to embark upon mission STS-48 carrying the Upper Atmosphere Research Satellite. The launch is scheduled for 5:57 p.m. (CDT) and the launch window extends for approximately 2 1/2 hours.

The Upper Atmosphere Research Satellite is the first major element of NASA's Mission to Planet Earth, a multi-year global research program that will use ground-based, airborne and space-based instruments to study the Earth as a complete environmental system. The satellite will study winters in the northern hemisphere and the Antarctic ozone hole during the satellite's planned 20-month life.

Also, 60 Protein Crystal Growth experiments will fly on this mission in the Space Shuttle's middeck area. The Marshall Space Flight Center is managing the flight of these experiments. These

-More-

experiments could improve food production and lead to innovative new pharmaceutical agents to combat cancer, immune system disorders, rheumatoid arthritis, emphsyema and many other diseases.

Principal Investigator for the Protein Crystal Growth experiments is Dr. Charles Bugg of the University of Alabama at Birmingham.

A nightime landing is expected at the Kennedy Space Center in Florida which has been designated as the primary landing site for this five day seven hour flight.

For those media desiring to cover STS-48 from the Marshall Center, the Public Affairs News Room, room 108B, building 4200, will operate weekdays from 8 a.m. to 5:30 p.m. Monday through Friday. News Room hours will be extended through launch time plus one hour on launch day.

When the News Room is closed, call (205) 544-1771 and ask to be connected to a public affairs representative.

NASA Select Television coverage of the STS-48 mission will be carried on RCA Satcom F-2R, Transponder 13, located at 72 degrees west longitude. Media may use the video directly from the satellite, or may obtain dubs from the Marshall Center communications facility in Building 4207. Prior to picking up tapes, media should call NASA's television operations at 544-6158 or Marshall Network Control at 544-1771.

Media in the Huntsville area will be able to receive air-to-ground communications and commentary throughout the mission

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on 173.075 mhz.

An STS-48 vehicle pass is enclosed so that media may enter the Redstone gates more easily during the mission.

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NASA News

National Aeronautics and
Space Administration

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For Release

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Nov. 22, 1991

RELEASE NO: 91-183

MARSHALL CENTER COMBINED FEDERAL CAMPAIGN NETS RECORD CONTRIBUTION

"We had a great Combined Federal Campaign at Marshall this fall, and I am very excited that we were able to lead our community in total contributions," said Lana Cucarola, CFC Executive Chairperson for the Marshall Space Flight Center. "I know that all of the Marshall employees are very proud that so much money will be going out to those who need a helping hand in this area."

Contributions by NASA employees to the federal government's Combined Federal Campaign this year set a record high and topped last year's total contribution by $50,457. A total of 3,330 employees pledged **$403,476.** The average gift was more than $121, which was an increase of $8 over last year's figure.

"We are excited that our Marshall Center employees have such

-More-

caring hearts and give so generously to the Combined Federal Campaign. This year's total contributions were just great. Marshall Space Flight Center is a vital part of the Huntsville community, and I'm glad that we can give help to those who need "A Helping Hand from a Caring Heart'," said Cucarola.

"Marshall people have always strongly supported the Combined Federal Campaign. This year was no exception," she said.

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NASA Fact Sheet

National Aeronautics and
Space Administration

Marshall Space Flight Center
Huntsville, Alabama 35812

Allen Kenitzer
Marshall Space Flight Center, Huntsville, Ala.
(Phone: 205/ 544-0034)

February 1992

ATLAS-1: The First Atmospheric Laboratory for Applications and Science

Earth is the launching pad for space missions of all types. It is our home port, but is it a safe haven? Today we face a number of environmental problems on the home front: the destruction of forests, depletion of the ozone layer and air pollution, to name only a few.

If we hope to preserve our fragile environment, we must first understand our planet's major components — the land, oceans and atmosphere — how they interact with one another and how other forces such as the sun and Earth's magnetic field interact with them. A series of NASA Space Shuttle missions will assist this effort through detailed studies of one part of the complex system that supports life on Earth: the atmosphere. The series, called Atmospheric Laboratory for Applications and Science (ATLAS for short), uses Spacelab, a Shuttle-based research laboratory.

ATLAS missions are part of Phase I of NASA's Mission to Planet Earth, a large-scale, unified study of planet Earth as a single, dynamic system. Throughout the ATLAS series, scientists will gather new information to gain a better understanding of how the atmosphere reacts to natural and human-induced atmospheric changes. That knowledge will help us identify measures that will keep our planet suitable for life for future generations.

Mission Overview

ATLAS-1 will fly aboard Space Shuttle Atlantis on mission STS-45 in spring 1992. It is the first of up to nine ATLAS missions that will be undertaken throughout one solar cycle, which lasts 11 years. During that period solar flares, sunspots

(Continued on next page)

and other magnetic activity in the sun changes from one extreme to the other and back.

The mission will carry 14 experiments to investigate the interactions of the Earth's atmosphere and the sun. The experiments will study the chemistry, physics and movement of the middle and upper atmosphere by measuring the sun's energy. They also will observe the links between magnetic fields and electrified gases, called plasma, that lie between the sun and Earth. By studying these factors throughout a solar cycle, scientists will be able to form a more detailed picture of Earth's atmosphere and its response to changes in the sun. Also, an astronomical telescope will examine sources of ultraviolet radiation in the Milky Way and other galaxies to learn more about the stages in the life of a star.

The Space Shuttle Atlantis will carry the ATLAS-1 Spacelab on an eight-day flight, during which its crew will gather information that will be used by scientists on the ground. The European Space Agency provided the reusable Spacelab platform in 1981 as its contribution to the Space Shuttle program. The versatile Spacelab facility comprises pressurized modules that provide laboratory work space and open U-shaped platforms, called pallets, that hold instruments requiring direct exposure to space, such as telescopes. On missions such as ATLAS, which use open pallets alone, the instruments' power supply, command- and data-handling system, and the temperature control system are housed in a pressurized container, called an igloo.

Spacelab elements are arranged in the Space Shuttle cargo bay to meet the unique needs of each flight. For the ATLAS-1 mission, the scientific instruments will be mounted on two Spacelab pallets in the Shuttle cargo bay. Most of the instruments flew on earlier Spacelab missions, reducing the cost of this space-based research. Reuse of these facilities also will allow scientists to expand their base of knowledge to provide a more accurate, long-term picture of our planet and its environment. From Atlantis's 183-mile-high orbit, these instruments will be exposed directly to space when the Shuttle bay doors are open. During the mission, the orbiter's position will be changed frequently to point the scientific instruments toward their targets: the sun, the Earth and space.

NASA's Office of Space Science and Applications, Washington, D.C., sponsors the ATLAS-1 mission. Marshall Space Flight Center, Huntsville, Ala., is responsible for training the science crew and the ground-based science team. During the flight, NASA's Spacelab Mission Operations Control facility at Marshall will control science activities.

Kennedy Space Center in Florida will prepare the Spacelab and will launch it aboard Atlantis. Johnson Space Center in Houston, Texas, will train the flight crew and provide Shuttle orbiter flight control.

Other countries participating in experiments on the ATLAS-1 payload are Belgium, France, Germany, Japan, the Netherlands, Switzerland and the United Kingdom. The European Space Agency will provide operational support for the European investigations.

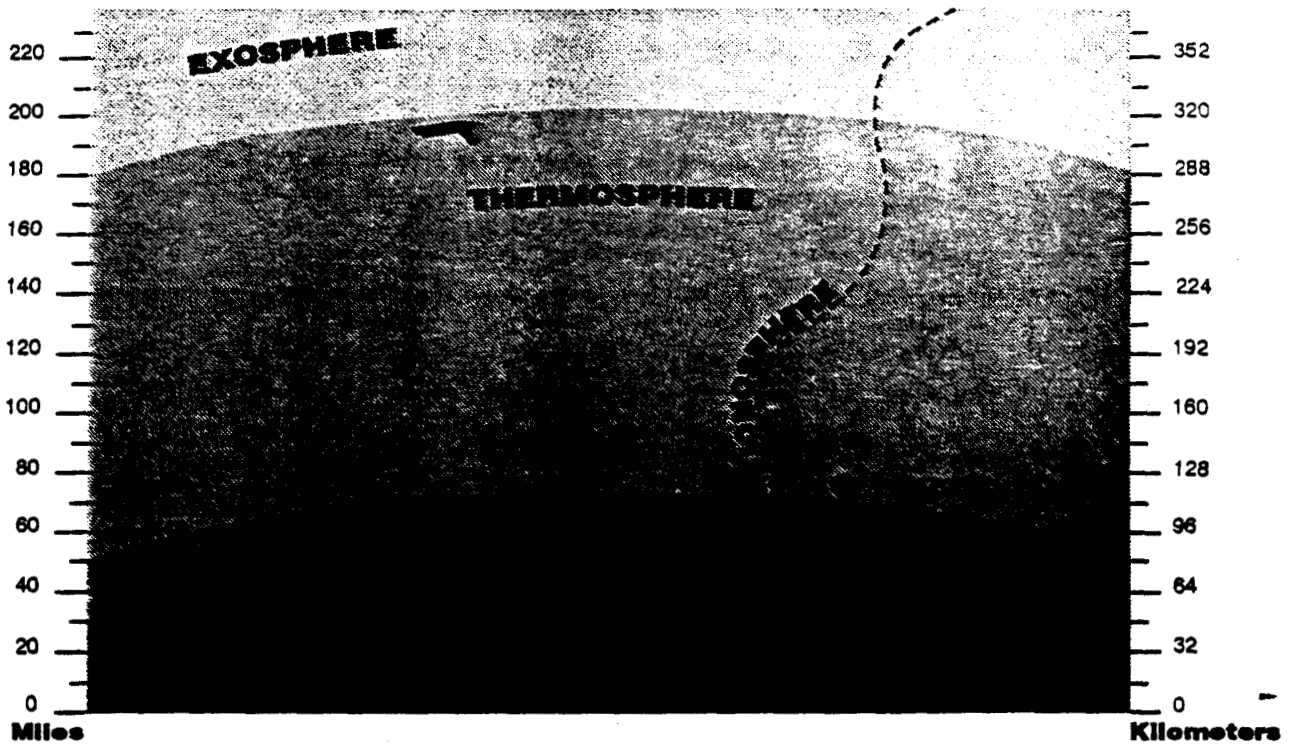
Unraveling the mysteries of the atmosphere requires dedication and patience. Each Shuttle mission is the culmination of long years of hard work, which continues after the Shuttle returns to Earth. Scientists will spend years poring over the data collected during the mission. This information will be organized at a special data-processing facility at NASA's Goddard Space Flight Center, Greenbelt, Md., where it will be made available to other researchers studying global change, and form the foundation for the remaining missions in the 11-year ATLAS series.

Scientific Investigations

Without the atmosphere, life as we know it could not survive. Proper atmospheric pressure, temperature and oxygen levels are critical to maintaining life. Energy is absorbed and cycled when radiation from the sun interacts with atmospheric chemicals — mainly nitrogen and oxygen, with traces of carbon dioxide, water vapor and other gases. Additionally, energy is absorbed and cycled when charged particles (ions and electrons) interact with the magnetic field generated by the Earth's core.

Human activities, including agriculture and industry, affect these complex processes. For example, the chlorofluorocarbons (CFCs) used in air conditioning and other industries rise to the stratosphere, where they are reduced to reactive

EARTH'S ATMOSPHERE



Five Atmospheric Layers

Troposphere: (0-6.8 miles) From the Greek *tropos*, meaning to turn; this layer literally turns, creating visible weather changes. It is well-mixed; there is no variation in concentration of its major components -- oxygen and nitrogen -- with altitude. Jet aircraft cruise at altitudes up to 6.6 miles.

Stratosphere: (6.8-30 miles) From the Latin *stratum*, meaning layer. Ozone, an important chemical that acts like a blanket to absorb harmful ultraviolet radiation from the sun, is found in this layer. To fly in this layer requires a Concorde or military jet, a rocket, or a scientific helium balloon.

Mesosphere: (30-50 miles) From the Greek *mesos*, meaning middle. This is the coldest part of the atmosphere. Only the largest helium balloons on scientific missions can fly in this layer.

Thermosphere: (80-300 miles) From the Greek *therme*, meaning heat; its temperature varies from 932 to 3,362 degrees Fahrenheit, depending on the sun's activity. The lowest level at which a spacecraft can orbit for any reasonable time is in this layer.

Exosphere: (180+ miles) The upper layer that extends to the undefined region where Earth's atmosphere gradually merges with planetary gases. ATLAS-1 will be flown at an altitude of 183 miles, which places its instruments above the four lower layers.

Atmospheric Regions and Factors

Ionosphere: Region where electrically charged gases, called plasma, move across the mesosphere and thermosphere. Its range and movement are influenced by Earth's magnetic fields and the solar wind. Ions affect radio waves; all satellite communications transmit radio waves through the ionosphere.

Ions: Atoms contain positively charged protons and negatively charged electrons; the resulting atom that remains is called an ion; this process is called ionization.

Ionization: Since solar radiation causes ionization, electron density increases on the daylight side of Earth. Electrons absorb radio waves. At night, ions tend to recombine with electrons to form neutral atoms. Radio reception from distant stations often is better during evening hours.

Magnetosphere: A plasma region dominated by Earth's magnetic field. Plasma is neither gas, liquid, nor solid; it has been referred to as the fourth state of matter. This is a charged-particle environment; at its base, it merges into the ionosphere. The Van Allen radiation belts and the various high-latitude aurora phenomena are found in this region.

chlorine that depletes the ozone layer, which protects the Earth's surface from harmful solar radiation. Halons, which contain bromine and are commonly used as fire inhibitors, behave similarly. Naturally occurring chemicals such as methane and nitrous oxide can lead to ozone depletion or inhibit chlorine-induced ozone depletion. Atmospheric concentrations of all these gases are increasing, as is the concentration of carbon dioxide, which is produced by fossil fuel combustion. These changes are likely to result in increased stratospheric ozone depletion and changes in atmospheric temperatures. The ATLAS mission will help scientists validate and refine their models of the effects of chemical change in the stratosphere.

Earth's atmosphere comprises five layers: troposphere, stratosphere, mesosphere, thermosphere and exosphere. These are classified by temperature, pressure and chemical composition.

Imbedded in the mesosphere and thermosphere is an electrically charged area called the ionosphere. Beyond the ionosphere is the magnetosphere, which separates Earth's magnetic field from interplanetary space. The solar wind — a high-speed stream of charged particles (electrons and protons) from the sun — gives the magnetosphere a comet-like shape with a tail extending for vast distances from the night side of the planet.

The boundaries of these layers are not exact; they interact and form a chain from Earth's surface to interplanetary space. Since they are interconnected, what happens at levels above the clouds affects us on the ground below.

The instruments aboard ATLAS-1 will collect information about the composition of Earth's atmosphere, investigate how Earth's electric and magnetic fields and atmosphere influence one another, examine sources of ultraviolet light in the universe, and measure the energy contained in sunlight and how that energy varies during the mission. The ATLAS-1 investigations are divided into four broad areas: atmospheric science, solar science, space plasma physics and astronomy.

A master timeline schedule is programmed into a computer aboard the Spacelab to orchestrate many mission experiment sequences automatically. Although this timeline may be revised if necessary, computer coordination contributes to the smooth operation of complex scientific instruments and tasks.

Most of the atmospheric and solar instruments and the astronomical telescope will be computer operated; the instrument data will be sent directly to scientists at the Spacelab Mission Operations Control facility on the ground. The crew will run the space plasma physics instruments manually. For example, the crew will report to their counterparts on the ground on visual effects observed from the firing of a beam of charged particles (electrons) into the surrounding plasma.

ATLAS-1 instrument controls are located in the aft flight deck of the Shuttle orbiter. The crew will ensure that automatically controlled instruments function properly and enter observational sequences for manually controlled equipment. They also will fine-tune and align video cameras and television monitors, and select camera filters, among other tasks.

Atmospheric Science

Six atmospheric science investigations on ATLAS-1 will study the middle and upper atmosphere with a variety of instruments that will help correlate atmospheric composition, temperature and pressure with altitude, latitude, longitude and changes in solar radiation. The types of environmental phenomena to be examined include global distribution of atmospheric components and temperatures, as well as atmospheric reaction to external influences such as solar input and geomagnetic storms. The high-altitude effects of terrestrial environmental episodes — volcanic eruptions, forest fires, massive oil fires in Kuwait — may also be examined. Data collection will help scientists to monitor short- and long-term changes, the goal of the series of ATLAS flights.

Gases in the upper atmosphere and ionosphere undergo constant changes triggered by variations in ultraviolet sunlight, by reactions between layers and by air motions. Many of the photochemical reactions — the effect of light or other radiant energy in producing chemical action — cause atoms and molecules to emit light of very specific wavelengths. These light signatures are called spectral features.

The **Imaging Spectrometric Observatory (ISO)** will measure spectral features to determine the composition of the atmosphere, down to trace amounts of chemicals measured in parts-per-trillion. This investigation, which previously flew

on Spacelab 1, will add to data about the varied reactions and energy transfer processes that occur in Earth's environment.

The **Atmospheric Trace Molecule Spectroscopy (ATMOS)** and the **Grille Spectrometer (Grille)** experiments will map trace molecules, including carbon dioxide and ozone, in the middle atmosphere. This mapping will be accomplished at orbital sunrise and sunset by measuring the infrared radiation that these molecules absorb. An orbital "day," with a sunrise and sunset, occurs approximately every 90 minutes during flight. These data will be compared with information gathered during other missions to note worldwide, seasonal and long-term atmospheric changes. Both instruments have flown previously, ATMOS on Spacelab 3 in 1985 and Grille on Spacelab 1 in 1983.

The **Atmospheric Lyman-Alpha Emissions (ALAE)** experiment will measure the abundance of two forms of hydrogen: common hydrogen and deuterium, or heavy hydrogen. ALAE will observe ultraviolet light, called Lyman-alpha, which hydrogen and deuterium radiate at slightly different wavelengths. Deuterium's relative abundance compared to hydrogen at the altitudes ALAE will study is an indication of atmospheric turbulence. After determining the hydrogen/deuterium ratio, scientists can better study the rate of water evolution in Earth's atmosphere.

The **Millimeter-Wave Atmospheric Sounder (MAS)** measures the strength of millimeter waves radiating at the specific frequencies of water vapor, chlorine monoxide and ozone. Observations of these gases will enable scientists to better understand their distribution through the upper atmosphere. MAS data will be particularly valuable because they should be unaffected by the presence of aerosols, the concentrations of which have increased by the eruption of Mount Pinatubo in June 1991.

The **Shuttle Solar Backscatter Ultraviolet Spectrometer (SSBUV)** is a calibrating experiment. Its measurements are compared to those from ozone-observing instruments aboard the National Oceanic and Atmospheric Administration's NOAA-9 and NOAA-11 satellites and NASA's NIMBUS-7 satellite. The SSBUV assesses instrument performance by directly comparing data from identical instruments aboard the NOAA spacecraft and NIMBUS-7 as the Shuttle and satellite pass over the same Earth location within an hour. SSBUV data also can be compared to data obtained by the Upper Atmosphere Research Satellite, which was launched in September 1991 to study the processes that lead to ozone depletion. The ATLAS-1 mission will be the fourth flight of SSBUV.

ATLAS-1 Quick Facts

ATLAS: Atmospheric Laboratory for Applications and Science.

Flight Number: STS-45.

Orbiter: Atlantis.

Launch Date: Spring 1992.

Altitude: 183 miles (296 kilometers).

Orbital Path: Circular.

Inclination: 57 degrees.

Mission Duration: Eight days.

Payload Operations: Fourteen investigations in four areas: atmospheric science, solar science, space plasma physics, and astronomy.

Spacelab Configuration: Thirteen instruments, mounted on two platforms in the Shuttle payload bay.

Crew Assignments: Seven members working around the clock in alternating 12-hour shifts.

Commander — Colonel Charles F. Bolden, Jr. (USMC)
Pilot — Lieutenant Colonel Brian Duffy (USAF)
Orbiter Mission Specialist — Captain David C. Leestma (USN)
Mission Specialist — Dr. C. Michael Foale
Payload Commander — Dr. Kathryn D. Sullivan
Payload Specialist — Dr. Byron K. Lichtenberg
Payload Specialist — Dr. D. Dirk Frimout
Alternate Payload Specialist — Dr. Charles R. Chappell
Alternate Payload Specialist — Dr. Michael L. Lampton

Solar Physics

Four solar physics investigations will measure the sun's energy output to determine its variations. Such information is important for understanding the effect of solar radiation on the composition of the Earth's atmosphere and ionosphere. Scientists studying our climate and the physical processes of the sun also use the information.

Because the sun is Earth's major source of heat, it drives atmospheric circulation and affects the weather. A change of only a few degrees in the temperature of Earth's atmosphere might cause dramatic changes in the ocean levels, ice caps and climate. There is evidence that the solar constant, the amount of heat normally received at the outer layer of our atmosphere, fluctuates. Therefore, it is important to determine its range and variability.

The **Active Cavity Radiometer** (**ACR**) and the **Measurement of Solar Constant** (**SOLCON**) experiments will measure the total amount of light and energy emitted by the sun, which is especially important in climate studies. The **Solar Spectrum Measurement** (**SOLSPEC**) , **the Solar Ultraviolet Spectral Irradiance Monitor** (**SUSIM**) and SSBUV investigations will add to our understanding of how variations in the sun's energy output affect the chemistry of the atmosphere. Spectral information is needed to study atmospheric reactions because different atmospheric components at different altitudes absorb different wavelength ranges.

Space Plasma Physics

Two space plasma physics instruments, the **Atmospheric Emissions Photometric Imaging** (**AEPI**) and **Space Experiments with Particle Accelerators** (**SEPAC**), will study the charged particle and plasma environment. A third investigation, **Energetic Neutral Atom Precipitation** (**ENAP**), will be conducted using data from the ISO instrument. Active and passive probing techniques will investigate key cause-and-effect relationships that link the Earth's magnetosphere, ionosphere and upper atmosphere. Electron and plasma beams will be injected into the surrounding space plasma to study phenomena such as aurora — visible signatures of magnetic storms that can disrupt telecommunications, power transmissions and spacecraft electronics — and spacecraft glow.

Spacecraft glow is a recently discovered phenomenon. On Shuttle missions, surfaces facing the direction of travel were covered with a faintly glowing, thin orange layer. Understanding spacecraft glow is very important because of its impact on experiments in the cargo bay and on other satellites. This emission of light could interfere with sensitive data-collecting instruments.

The space plasma investigations also will help us understand the effects of solar energy on our weather, communications and spacecraft technologies.

Astronomy

The **Far Ultraviolet Space Telescope** (**FAUST**), which flew on Spacelab 1, will study astronomical sources of radiation at ultraviolet wavelengths that are inaccessible to observers on Earth. Much remains to be learned about the stages of the rate of star formation in other galaxies.

Young stars reach very high temperatures and emit intense ultraviolet radiation, which cannot be detected by ground-based astronomers. However, this radiation can be detected by an ultraviolet sensor, such as the FAUST, placed outside Earth's atmosphere. Better knowledge of ultraviolet emission sources will lead to improved understanding of the life cycle of stars and galaxies throughout the universe.

The Atlas Program

ATLAS-1, the first of the ATLAS series of Shuttle flights, is an important part of the long-term, coordinated research that makes up NASA's Mission to Planet Earth. The ATLAS-1 solar science instruments and several of the atmospheric science instruments (MAS, ATMOS and SSBUV) will fly on future ATLAS missions. Beyond its own science mission, a key goal of the ATLAS series is to provide calibration for NASA's Upper Atmosphere Research Satellite (UARS), launched from the Space Shuttle in September 1991. Two ATLAS-1 instruments, ACR and SUSIM, have direct counterparts aboard UARS, while other instruments aboard each mission are closely related. Repeated flights of the ATLAS instruments, which can be carefully calibrated before and after each flight, will allow for long-term calibration of UARS instruments.

The next ATLAS flight, ATLAS-2, is scheduled for launch in spring 1993. Immediately after ATLAS-1 lands, the science teams for instruments flying on ATLAS-2 will begin recalibrating and preparing their instruments for reflight, while analyzing and interpreting their ATLAS-1 data.

Crew Profile

The seven-member crew of ATLAS-1 will consist of a commander, a pilot, three mission specialists and two payload specialists. The orbiter crew — the commander, pilot and one mission specialist — will operate and maneuver the Shuttle, maintain the Shuttle's subsystems and ensure flight safety. The science crew — the payload commander, the other mission specialist and the payload specialists — will manage the Spacelab and perform experiments.

The orbiter crew and mission specialists are career NASA astronauts. Payload specialists and alternate payload specialists are members of the science community. These crew members were chosen by an Investigator Working Group, made up of the chief scientists for each mission experiment. To make the best use of their short time in space, the crew will be divided into two teams, each working alternate 12-hour shifts.

The commander is U.S. Marine Corps Colonel Charles F. Bolden Jr., an astronaut since 1980. His previous missions include STS-61C, which made a night landing at Dryden Flight Research Facility, and a more recent one, STS-31, which deployed the Hubble Space Telescope.

The pilot is U.S. Air Force Lieutenant Colonel Brian Duffy, who became an astronaut in 1986. He has participated in the development of Shuttle computer software and has served as Technical Assistant to the Director of Flight Crew Operations. Lieutenant Colonel Duffy represents the Astronaut Office in all matters concerning the ascent phase of flight. ATLAS-1 will be his first Shuttle flight.

The orbiter mission specialist is U.S. Navy Captain David C. Leestma, an astronaut since 1980. During Shuttle mission STS-41G, he performed a "spacewalk" to demonstrate the feasibility of satellite refueling. He also flew on STS-28, a Department of Defense mission. Captain Leestma currently is Deputy Director of the Flight Crew Operations Directorate.

Mission Specialist Dr. C. Michael Foale, selected as an astronaut in 1987, holds a doctorate in laboratory astrophysics. He has had responsibility for payload operations for four Shuttle missions. He is involved in the development of the spacewalk, assembly and rescue-operations plans for Space Station Freedom. This will be his first Shuttle flight.

Payload Commander Dr. Kathryn D. Sullivan, an astronaut since 1979, holds a doctorate in geology. Dr. Sullivan was the first U.S. woman to perform a spacewalk when she and Captain Leestma proved the feasibility of satellite refueling during mission STS-41G. She also helped deploy the Hubble Space Telescope during mission STS-31.

Payload Specialist Dr. D. Dirk Frimout of the European Space Agency holds a doctorate in applied physics. He has acted as crew coordinator and experiment coordinator for European experiments aboard several Spacelab missions and is a co-investigator on the Grille Spectrometer. This will be Dr. Frimout's first flight.

Payload Specialist Dr. Byron K. Lichtenberg holds a doctorate in biomedical engineering. He flew as the first U.S. payload specialist on Spacelab 1. He is a co-investigator on several experiments for other Spacelab missions and has written many articles on biomedical engineering and space flight.

The two alternate payload specialists are Dr. Charles R. Chappell and Dr. Michael L. Lampton. Alternate payload specialists train to back up the primary payload specialists. During the mission, they work with mission managers, principal investigators and the science team at Marshall Center's Spacelab Mission Operations Control facility.

Dr. Chappell, who holds a doctorate in space science, was the mission scientist for Spacelab 1 and currently is the Associate Director for Science at Marshall Center. He also is a co-investigator for the SEPAC instrument. Dr. Lampton holds a doctorate in physics. He served as an alternate payload specialist for the first Spacelab mission. Dr. Lampton, a co-investigator on the FAUST experiment, is a researcher at the Space Sciences Laboratory of the University of California in Berkeley.

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NASA

SPACE SHUTTLE MISSION STS-45

PRESS KIT

March 1992

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CONTENTS

RELEASE: 92-32

INTERNATIONAL STUDIES OF ATMOSPHERE, SUN HIGHLIGHT STS-45

Studies of the sun, the upper reaches of Earth's atmosphere and astronomical objects using an international array of instruments in Atlantis' cargo bay will highlight Shuttle Mission STS-45.

The 46th Shuttle flight and Atlantis' 11th, STS-45 is planned to be launched at 8:01 a.m. EST March 23. With an on-time launch, landing will be at 6:08 a.m. EST March 31 at the Kennedy Space Center, Fla.

Atlantis will carry the Atmospheric Laboratory for Applications and Science-1 (ATLAS-1), 12 instruments from the United States, France, Germany, Belgium, Switzerland, the Netherlands and Japan, that will conduct 13 experiments to study the chemistry of the atmosphere, solar radiation, space plasma physics and ultraviolet astronomy. ATLAS-1 is planned to be the first of several ATLAS flights designed to cover an entire 11-year solar cycle, the regular period of energetic activity by the sun. Co-manifested with ATLAS-1 is the Shuttle Solar Backscatter Ultraviolet Instrument (SSBUV), which provides highly calibrated measurements of ozone to fine-tune measurements made by other NASA and NOAA satellites.

Commanding Atlantis will be Charles Bolden, making his third space flight. Brian Duffy will serve as pilot, making his first shuttle flight. Mission Specialists include Kathy Sullivan, making her third flight; Dave Leestma, making his third space flight; and Mike Foale, making his first space flight. Payload specialists will be Byron Lichtenberg, making his second flight, and Dirk Frimout, Belgian Scientist, making his first flight.

ATLAS operations will continue 24 hours a day, with the crew split into two teams each on a 12-hour shift. The Red Team will consist of Leestma, Foale and Lichtenberg. The Blue Team will be Duffy, Sullivan and Frimout. Bolden, as Commander, will set his own hours.

Secondary experiments aboard Atlantis will include Space Tissue Loss, a study of the effects of weightlessness on body tissues; the Visual Function Tester, a study of the effects of weightlessness on human vision; the Radiation Monitoring Equipment, an often-flown device that measures radiation aboard the Shuttle; Investigations into Polymer Membrane Processing, a study of developing polymer membranes used as filters in many industries and in space and the Cloud Logic to Optimize Use of Defense Systems, an investigation to quantify the variation in apparent cloud cover as a function of the angle at which clouds of various types are viewed.

Also flying on STS-45 will be NASA's Get Away Special payload, a program which provides individuals and organizations the opportunity to send scientific research and development experiments on board a Space Shuttle.

In addition, the Shuttle Amateur Radio Experiment will provide amateur radio operators worldwide, plus students at several selected schools, the opportunity to converse with crew members aboard Atlantis.

- end of general release, background material follows -

MEDIA SERVICES

NASA Select Television Transmission

NASA Select television is available on Satcom F-2R, Transponder 13, located at 72 degrees west longitude; frequency 3960.0 MHz, audio 6.8 MHz.

The schedule for television transmissions from the orbiter and for the change-of-shift briefings from Johnson Space Center, Houston, will be available during the mission at Kennedy Space Center, Fla.; Marshall Space Flight Center, Huntsville, Ala.; Johnson Space Center; and NASA Headquarters, Washington, D.C. The television schedule will be updated to reflect changes dictated by mission operations.

Television schedules also may be obtained by calling COMSTOR, 713/483-5817. COMSTOR is a computer data base service requiring the use of a telephone modem. A voice update of the television schedule may be obtained by dialing 202/755-1788. This service is updated daily at noon ET.

Status Reports

Status reports on countdown and mission progress, on-orbit activities and landing operations will be produced by the appropriate NASA newscenter.

Briefings

A mission press briefing schedule will be issued prior to launch. During the mission, change-of-shift briefings by the off-going flight director will occur at least once per day. The updated NASA Select television schedule will indicate when mission briefings are planned to occur.

STS-45 QUICK LOOK

Launch Date:	March 23, 1992
Launch Site:	Kennedy Space Center, Fla., Pad 39A
Launch Window:	8:01 a.m. - 10:31 a.m. EST
Orbiter:	Atlantis (OV-104)
Orbit:	160 x 160 nautical miles, 57 degrees inclination
Landing Date/Time:	6:08 a.m. EST, March 31, 1992
Primary Landing Site:	Kennedy Space Center, Fla.
Abort Landing Sites:	Return to Launch Site - Kennedy Space Center, Fla. Transoceanic Abort Landing - Zaragoza, Spain Alternates - Moron, Spain; Ben Guerir, Morocco Abort Once Around - White Sands, N.M.
Crew:	Charles Bolden, Commander Brian Duffy, Pilot Kathy Sullivan, Mission Specialist 1 David Leestma, Mission Specialist 2 Mike Foale, Mission Specialist 3 Dirk Frimout, Payload Specialist 1 Byron Lichtenberg, Payload Specialist 2
Cargo Bay Payloads:	ATLAS-1 (Atmospheric Laboratory for Applications and Science-1) SSBUV-4 (Shuttle Solar Backscatter Ultraviolet Instrument) GAS Canisters (Get-Away Specials)
Middeck Payloads:	RME-III (Radiation Monitoring Experiment-III) STL (Space Tissue Loss) VFT-II (Visual Function Tester-II) CLOUDS-1A (Cloud Logic to Optimize Use of Defense Systems) SAREX (Shuttle Amateur Radio Experiment) IPMP (Investigations into Polymer Membrane Processing)

STS-45 LAUNCH WINDOW

LAUNCH DATE	LAUNCH WINDOW OPENS GMT	EST	CST	LAUNCH WINDOW CLOSES GMT	EST	CST	DURATION
3/23/92	13:01	8:01 AM	7:01 AM	15:31	10:31 AM	9:31 AM	2:30
3/24/92	13:00	8:00 AM	7:00 AM	15:30	10:30 AM	9:30 AM	2:30
3/25/92	13:00	8:00 AM	7:00 AM	15:30	10:30 AM	9:30 AM	2:30
3/26/92	13:00	8:00 AM	7:00 AM	15:30	10:30 AM	9:30 AM	2:30
3/27/92	12:59	7:59 AM	6:59 AM	15:29	10:29 AM	9:29 AM	2:30
3/28/92	12:59	7:59 AM	6:59 AM	15:29	10:29 AM	9:29 AM	2:30
3/29/92	12:59	7:59 AM	6:59 AM	15:29	10:29 AM	9:29 AM	2:30

Note: Mission Duration is 07/22:07

STS-45 VEHICLE AND PAYLOAD WEIGHTS

	Pounds
Orbiter (Atlantis) empty and 3 SSMEs	172,293
Atmospheric Lab for Applications and Science-1	15,100
Get-Away Specials/Support Equipment	522
Shuttle Solar Backscatter Ultraviolet Instrument	720
Investigations of Polymer Membrane Processing	17
Radiation Monitoring Experiment-3	23
Space Shuttle Amateur Radio Experiment	30
Visual Function Tester-2	10
Space Tissue Loss	68
DSOs/DTOs	250
CLOUDS	5
Total Vehicle at SRB Ignition	4,495,910
Orbiter Landing Weight	205,046

STS-45 TRAJECTORY SEQUENCE OF EVENTS

EVENT	MET (d:h:m:s)	RELATIVE VELOCITY (fps)	MACH	ALTITUDE (ft)
Launch	00/00:00:00			
Begin Roll Maneuver	00/00:00:10	183	.16	776
End Roll Maneuver	00/00:00:19	418	.37	3,555
SSME Throttle Down to 89%	00/00:00:22	499	.44	4,791
SSME Throttle Up to 67%	00/00:00:31	718	.64	9,603
Max. Dyn. Pressure (Max Q)	00/00:00:56	1,244	1.20	30,580
SSME Throttle Up to 104%	00/00:01:06	1,538	1.55	42,347
SRB Separation	00/00:02:05	4,141	3.79	155,086
Main Engine Cutoff (MECO)	00/00:08:35	25,001	21.62	376,676
Zero Thrust	00/00:08:41	24,999	N/A	376,909
ET Separation	00/00:08:53			
OMS-2 Burn	00/00:37:08			
Landing	07/22:07:00			

Apogee, Perigee at MECO: 157 x 19 nautical miles
Apogee, Perigee post-OMS 2: 161 x 160 nautical miles

SPACE SHUTTLE ABORT MODES

Space Shuttle launch abort philosophy aims toward safe and intact recovery of the flight crew, orbiter and its payload. Abort modes include:

* Abort-To-Orbit (ATO) -- Partial loss of main engine thrust late enough to permit reaching a minimal 105-nautical mile orbit with orbital maneuvering system engines.

* Abort-Once-Around (AOA) -- Earlier main engine shutdown with the capability to allow one orbit around before landing at either White Sands Space Harbor, N.M., or the Shuttle Landing Facility (SLF) at Kennedy Space Center, Fla.

* Trans-Atlantic Abort Landing (TAL) -- Loss of one or more main engines midway through powered flight would force a landing at either Zaragoza, Spain; Moron, Spain; or Ben Guerir, Morocco.

* Return-To-Launch-Site (RTLS) -- Early shutdown of one or more engines, and without enough energy to reach Zaragoza, would result in a pitch around and thrust back toward KSC until within gliding distance of the SLF.

STS-45 contingency landing sites are Kennedy Space Center, White Sands, Zaragoza, Moron and Ben Guerir.

STS-45 PRE-LAUNCH PROCESSING

Flight preparations on Atlantis for the STS-45 mission began Dec. 9, 1991 following its last mission, STS-44, which ended with a landing at Edwards Air Force Base, Calif.

Atlantis was processed in 55 days, the best ever since mission STS-43, the previous record breaker with a 60-day Orbiter Processing Facility (OPF) flow. Processing took place in OPF bay 2 to prepare Atlantis for its 11th flight, including the installation of the ATLAS-1 payload which is the primary payload for mission STS-45.

Atlantis' systems were fully tested while in the OPF, including the orbital maneuvering system and the forward reaction control system.

Space Shuttle main engine locations for this flight are as follows: engine 2024 in the No. 1 position, engine 2012 in the No. 2 position and engine 2028 in the No. 3 position. These engines were installed on Jan. 10-11.

Work began in January 1990 at KSC to assemble the ATLAS payload components. Over the last 2 years, payload technicians joined the two ATLAS pallets, integrated the experiments and completed required tests. Technicians installed the ATLAS payload into Atlantis' payload bay on Jan. 25, 1992, while the Shuttle was in the OPF. The Shuttle Solar Backscatter Ultraviolet experiment was installed in the payload bay on Jan. 28. A 43-hour test, verifying connections between the orbiter and payload, was performed Jan. 29-31. The payload was closed out for flight in the OPF on Feb. 9.

The Crew Equipment Interface Test, with the STS-45 flight crew, was conducted in the OPF on Feb. 1. The crew became familiar with the configuration of the orbiter, the ATLAS payload and unique equipment for mission STS-45.

Booster stacking operations on mobile launcher platform 1 began Dec. 10 and were completed by Jan. 15. The external tank was mated to the boosters on Jan. 22 and the orbiter Atlantis was transferred to the Vehicle Assembly Building on Feb. 13, where it was mated to the external tank and solid rocket boosters.

The STS-45 vehicle was rolled out to Launch Pad 39-A on Feb. 19. A dress rehearsal launch countdown with the flight crew members was held Feb. 26-27 at KSC.

A standard 43-hour launch countdown is scheduled to begin 3 days prior to launch. During the countdown, the orbiter's onboard fuel and oxidizer storage tanks will be loaded and all orbiter systems will be prepared for flight.

About 9 hours before launch, the external tank will be filled with its flight load of a half a million gallons of liquid oxygen and liquid hydrogen propellants. About 2 and one-half hours before liftoff, the flight crew will begin taking their assigned seats in the crew cabin.

The end of mission landing is planned at the KSC Shuttle Landing Facility. KSC's landing convoy teams will be on station to prepare the vehicle for towing to the OPF. Atlantis' next flight will be mission STS-46 with the U.S./Italian Tethered Satellite System and the European Space Agency EURECA payload scheduled for launch this summer.

ATLAS-1

ATLAS-1 is the first of up to 10 ATLAS missions to be undertaken throughout one solar cycle, which lasts 11 years. During that period, a cycle of solar flares, sunspots and other magnetic activity moves from intense activity to relative calm.

ATLAS missions are part of Phase I of NASA's Mission to Planet Earth, a large-scale, unified study of planet Earth as a single, dynamic system. Throughout the ATLAS series, scientists will gather new information to gain a better understanding of how the atmosphere reacts to natural and human-induced atmospheric changes. That knowledge will help identify measures that will keep the planet suitable for life for future generations.

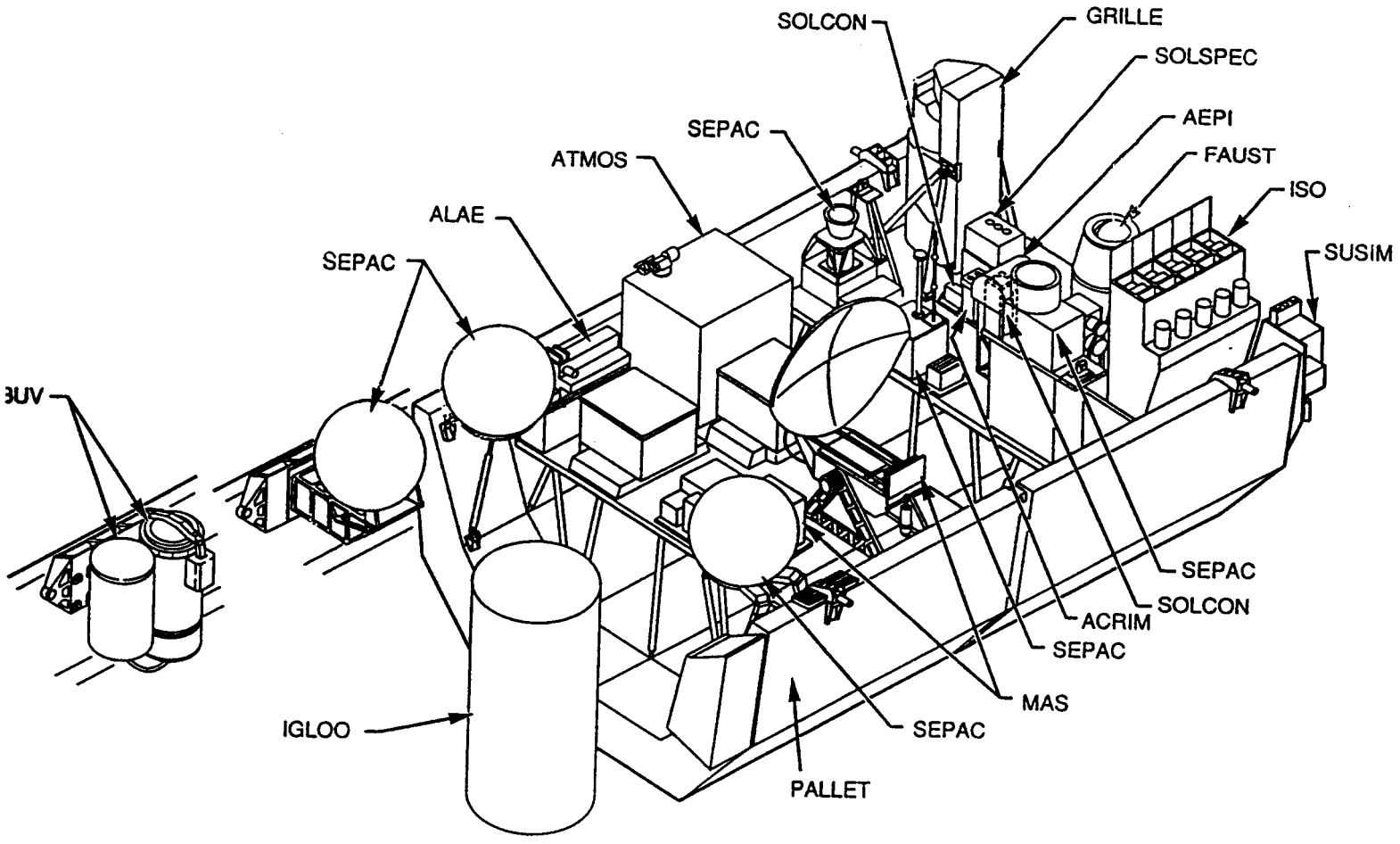
ATLAS-1 will perform 14 experiments using 12 instruments to investigate the interactions of the Earth's atmosphere and the sun. The experiments will study the chemistry, physics and movement of the middle and upper atmosphere by measuring the sun's energy and the distribution of trace chemicals in the atmosphere.

By studying these factors throughout a solar cycle, scientists will form a more detailed picture of Earth's atmosphere and its response to changes in the sun. The ATLAS-1 instruments also will observe the links between magnetic fields and electrified gases, called plasma, that lie between the sun and Earth. Also, an astronomical telescope will examine sources of ultraviolet radiation in the Milky Way and other galaxies to learn more about the stages in the life of a star.

The Space Shuttle Atlantis will carry the ATLAS-1 Spacelab on an 8-day flight, during which its crew will gather information to be used by scientists on the ground. The European Space Agency provided the reusable Spacelab platform in 1981 as its contribution to the Space Shuttle program. The versatile Spacelab facility is comprised of pressurized modules that provide laboratory work space and open U-shaped platforms, called pallets, that hold instruments requiring direct exposure to space, such as telescopes. On missions such as ATLAS, which use open pallets alone, the instruments' power supply, command and data-handling system and the temperature control system are housed in a pressurized container called an igloo.

Spacelab elements are arranged in the Space Shuttle cargo bay to meet the unique needs of each flight. For the ATLAS-1 mission, the scientific instruments will be mounted on two Spacelab pallets in the Shuttle cargo bay. All of the instruments flew on earlier Spacelab missions and others will fly on future ATLAS missions, reducing the cost of this space-based research. Reuse of these facilities also will allow scientists to expand their base of knowledge to provide a more accurate, long-term picture of planet Earth and its environment. From Atlantis' 160-nautical-mile orbit, these instruments will be exposed directly to space when the Shuttle bay doors are open. During the mission, the orbiter's position will be changed frequently to point the scientific instruments toward their targets -- the sun, the Earth and space.

Atlas-1 Pallet



NASA's Office of Space Science and Applications, Washington, D.C sponsors the ATLAS-1 mission. Marshall Space Flight Center, Huntsville, Ala., is responsible for training the science crew and the ground-based science team. During the flight, NASA's Spacelab Mission Operations Control facility at Marshall will control science activities.

Kennedy Space Center in Florida will prepare the Spacelab and will launch it aboard Atlantis. Johnson Space Center in Houston will train the flight crew and provide Shuttle orbiter flight control.

Other countries participating in experiments on the ATLAS-1 payload are Belgium, France, Germany, Japan, the Netherlands, Switzerland and the United Kingdom. The European Space Agency will provide operational support for the European investigations.

Scientists will spend years poring over the data collected during the ATLAS-1 mission. This information will be organized at a special data-processing facility at NASA's Goddard Space Flight Center, Greenbelt, Md., where the data will be made available to other researchers studying global change and form the foundation for the remaining missions in the 11-year ATLAS series.

ATLAS SCIENTIFIC INVESTIGATIONS

Without the atmosphere, life as humans know it could not survive. Proper atmospheric pressure, temperature and oxygen levels are critical to maintaining life. Energy is absorbed and cycled when radiation from the sun interacts with atmospheric chemicals — mainly nitrogen and oxygen, with traces of carbon dioxide, water vapor and other gases. Additionally, energy is absorbed and cycled when charged particles (ions and electrons) interact with the magnetic field generated by the Earth's core.

Human activities, including agriculture and industry, affect these complex processes. For example, the chlorofluorocarbons (CFCs) used in air conditioning and other industries rise to the stratosphere, where they are reduced to reactive chlorine that depletes the ozone layer which protects the Earth's surface from harmful solar radiation. Halons, which contain bromine and are commonly used as fire inhibitors, behave similarly. Naturally occurring chemicals such as methane and nitrous oxide can lead to ozone depletion or inhibit chlorine-induced ozone depletion. Atmospheric concentrations of all these gases are increasing, as is the concentration of carbon dioxide, which is produced by fossil fuel combustion. These changes are likely to result in increased stratospheric ozone depletion and changes in atmospheric temperatures. The ATLAS mission will help scientists validate and refine their models of the effects of chemical change in the stratosphere.

Earth's atmosphere comprises five layers: troposphere, stratosphere, mesosphere, thermosphere and exosphere. These are classified by temperature, pressure and chemical composition.

ATLAS-1 Investigations

Investigation	Spectral Range	Selected Objectives	Principal Investigator
Atmospheric Science:			
ALAE	Far Ultraviolet	Ratio of atmospheric hydrogen to deuterium	J.L. Bertaux, Service d'Aeronomie du CNRS, France
ATMOS	Infrared	Water vapor, ozone, methane, nitrogen compounds	M. Gunson, Jet Propulsion Laboratory, United States
GRILLE	Infrared	Water vapor, ozone, methane, nitrogen compounds	M. Ackerman, Institut d'Aeronomie Spatiale de Belgique, Belgium
ISO	Visible/Ultraviolet	Atmospheric temperature, nitrogen, oxygen, ions	D.G. Torr, U. Alabama-Huntsville, United States
MAS	Microwave	Temperature, pressure, ozone, chlorine monoxide	G. Hartmann, Max-Planck-Institute for Aeronomy, Germany
SSBUV	Near Ultraviolet	Ozone	E. Hilsenrath, Goddard Space Flight Center, United States
Solar Science:			
ACRIM	Total Energy	Solar constant	R. Willson, JPL, United States
SOLCON	Total Energy	Solar constant	D. Crommelynck, Institut Royal Meteorologique de Belgique, Belgium
SOLSPEC	Infrared to Ultraviolet	Solar spectrum	G. Thuillier, Service d'Aeronomy du CNRS, France
SUSIM	Ultraviolet	Solar spectrum	G. Brueckner, Naval Research Laboratory, United States
Plasma physics:			
AEPI	Visible	Natural aurora and airglow	S. Mende, Lockheed Palo Alto Research Laboratory, United States
SEPAC		Response of plasmas to known disturbances	J. Burch, Southwest Research Institute, United States
ENAP	Visible/Ultraviolet	Use ISO data to study emissions from energetic atoms	B. Tinsley, U. Texas at Dallas, United States
Astrophysics:			
FAUST	Far Ultraviolet	Large-scale astrophysical objects	S. Bowyer, U. California-Berkeley, United States

Imbedded in the mesosphere and thermosphere is an electrically charged area called the ionosphere. Beyond the ionosphere is the magnetosphere, which separates Earth's magnetic field from interplanetary space. The solar wind — a high-speed stream of charged particles from the sun — gives the magnetosphere a comet-like shape with a tail extending for vast distances from the planets night side.

The boundaries of these layers are not exact. They interact and form a chain from Earth's surface to interplanetary space. Since they are interconnected, what happens at levels above the clouds affects us on the ground below.

The instruments aboard ATLAS-1 will collect information about the composition of Earth's atmosphere, investigate how Earth's electric and magnetic fields and atmosphere influence one another, examine sources of ultraviolet light in the universe and measure the energy contained in sunlight and how that energy varies during the mission. The ATLAS-1 investigations are divided into four broad areas -- atmospheric science, solar science, space plasma physics and astronomy.

A master timeline schedule is programmed into a computer aboard the Spacelab to orchestrate mission experiment sequences automatically. Although this timeline may be revised if necessary, computer coordination contributes to the smooth operation of complex instruments and tasks.

Most of the atmospheric and solar instruments and the astronomical telescope will be computer operated. The instrument data will be sent directly to scientists at the Spacelab Mission Operations Control facility on the ground. The crew will run the space plasma physics instruments manually. For example, the crew will report to their counterparts on the ground on visual effects observed from the firing of a beam of charged particles (electrons) into the surrounding plasma.

ATLAS-1 instrument controls are located in the aft flight deck of the Shuttle orbiter. The crew will ensure that automatically controlled instruments function properly and enter observational sequences for manually controlled equipment. They also will fine-tune and align video cameras and television monitors and select camera filters, among other tasks.

Atmospheric Science

Six atmospheric science investigations on ATLAS-1 will study the middle and upper atmosphere with a variety of instruments that will help correlate atmospheric composition, temperature and pressure with altitude, latitude, longitude and changes in solar radiation. The types of environmental phenomena to be examined include global distribution of atmospheric components and temperatures, as well as atmospheric reaction to external influences such as solar input and geomagnetic storms.

The high-altitude effects of terrestrial environmental episodes — volcanic eruptions, forest fires, massive oil fires in Kuwait — also may be examined. Data collection will help scientists monitor short- and long-term changes, the goal of the series of ATLAS flights.

Gases in the upper atmosphere and ionosphere undergo constant changes triggered by variations in ultraviolet sunlight, by reactions between layers and by air motions. Many of the photochemical reactions — the effect of light or other radiant energy in producing chemical action — cause atoms and molecules to emit light of very specific wavelengths. These light signatures are called spectral features.

The Imaging Spectrometric Observatory (ISO) will measure spectral features to determine the composition of the atmosphere, down to trace amounts of chemicals measured in parts-per-trillion. This investigation, which previously flew on Spacelab 1, will add to data about the varied reactions and energy transfer processes that occur in Earth's environment.

The Atmospheric Trace Molecule Spectroscopy (ATMOS) and the Grille Spectrometer (Grille) experiments will map trace molecules, including carbon dioxide and ozone, in the middle atmosphere. This mapping will be accomplished at orbital sunrise and sunset by measuring the infrared radiation that these molecules absorb. An orbital "day" consists of a sunrise and sunset occuring approximately every 90 minutes during flight. These data will be compared with information gathered during other missions to note worldwide, seasonal and long-term atmospheric changes. Both instruments have flown previously, ATMOS on Spacelab 3 in 1985 and Grille on Spacelab 1 in 1983.

The Atmospheric Lyman-Alpha Emissions (ALAE) experiment will measure the abundance of two forms of hydrogen -- common hydrogen and deuterium or heavy hydrogen. ALAE will observe ultraviolet light, called Lyman-alpha, which hydrogen and deuterium radiate at slightly different wavelengths. Deuterium's relative abundance compared to hydrogen at the altitude's ALAE will study is an indication of atmospheric turbulence in the lower thermosphere. After determining the hydrogen/deuterium ratio, scientists can better study the rate of water evolution in Earth's atmosphere. ALAE flew on Spacelab 1.

The Millimeter-Wave Atmospheric Sounder (MAS) measures the strength of millimeter-waves radiating at the specific frequencies of water vapor, chlorine monoxide and ozone. Observations of these gases will enable scientists to better understand their distribution through the upper atmosphere. MAS data will be particularly valuable because they should be unaffected by the presence of aerosols, the concentrations of which have increased by the eruption of Mount Pinatubo in June 1991. An earlier version of MAS flew on Spacelab 1.

Shuttle Solar Backscatter Ultraviolet

The Shuttle Solar Backscatter Ultraviolet (SSBUV), which measures atmospheric ozone levels, is a calibrating experiment co-manifested with ATLAS-1. Its measurements are compared to those from ozone-observing instruments aboard the National Oceanic and Atmospheric Administrations NOAA-9 and NOAA-11 satellites and NASA's NIMBUS-7 satellite to ensure the most accurate readings possible of atmospheric ozone trends. The SSBUV assesses instrument performance by directly comparing data from identical instruments aboard the NOAA spacecraft and NIMBUS-7 as the Shuttle and satellite pass over the same Earth location. SSBUV data also can be compared to data obtained by the Upper Atmosphere Research Satellite launched in September 1991 to study the processes that lead to ozone depletion. The solar data taken by SSBUV also will be compared with data from the four solar instruments.

SSBUV is physically separate from the ATLAS-1 payload, housed in two Get Away Special canisters mounted in the Shuttle's payload bay. The instrument canister holds the SSBUV, its aspect sensors and in-flight calibration system. The support canister contains the avionics, including power, data and command systems. SSBUV commands will be sent from a Payload Operations Control Center (POCC) at the Johnson Space Center. SSBUV data will be received at Johnson and the Marshall Space Flight Center.

SSBUV is co-manifested with future ATLAS flights. The ATLAS-1 mission will be the fourth flight of SSBUV, which previously flew in October 1989, October 1990 and August 1991. SSBUV is managed by the Goddard Space Flight Center, Greenbelt, Md.

Solar Science

Four solar science investigations will measure the sun's energy output to determine its variations and spectrum. Such information is important for understanding the effect of solar radiation on the composition of the Earth's atmosphere and ionosphere. Scientists studying Earth's climate and the physical processes of the sun also use the information

Because the sun is Earth's major source of heat, it drives atmospheric circulation and affects the weather. A change of only a few degrees in the temperature of Earth's atmosphere might cause dramatic changes in the ocean levels, ice caps and climate. There is evidence that the solar constant, the amount of heat normally received at the outer layer of Earth's atmosphere, fluctuates. Therefore, it is important to determine its range and variability.

The Active Cavity Radiometer (ACR) and the Measurement of Solar Constant (SOLCON) experiments will measure the total amount of light and energy emitted by the sun, which is especially important in climate studies.

The Solar Spectrum Measurement (SOLSPEC), the Solar Ultraviolet Spectral Irradiance Monitor (SUSIM) and SSBUV investigations will add to scientists' understanding of how variations in the sun's energy output affect the chemistry of the atmosphere. Spectral information is needed to study atmospheric reactions because different atmospheric components at different altitudes absorb different wavelength ranges. These four instruments have flown on previous Space Shuttle missions.

Space Plasma Physics

Two space plasma physics instruments, the Atmospheric Emissions Photometric Imaging (AEPI) and Space Experiments with Particle Accelerators (SEPAC), will study the charged particle and plasma environment. A third investigation, Energetic Neutral Atom Precipitation (ENAP), will be conducted using data from the ISO instrument. Active and passive probing techniques will investigate key cause-and-effect relationships that link the Earth's magnetosphere, ionosphere and upper atmosphere. Electron and plasma beams will be injected into the surrounding space plasma to study phenomena such as aurora — visible signatures of magnetic storms that can disrupt telecommunications, power transmissions and spacecraft electronics — and spacecraft glow.

Spacecraft glow is a recently discovered phenomenon. On Shuttle missions, surfaces facing into the direction of travel were covered with a faintly glowing, thin orange layer. Understanding spacecraft glow is very important because of its impact on experiments in the cargo bay and on other satellites. This emission of light could interfere with sensitive data-collecting instruments.

The space plasma investigations also will help us understand the effects of solar energy on our weather, communications and spacecraft technologies. AEPI and SEPAC flew on Spacelab 1.

Astronomy

Much remains to be learned about the stages and the rate of star formation in other galaxies. Young stars reach very high temperatures and emit intense ultraviolet radiation, which cannot be detected by ground-based astronomers. However, this radiation can be detected by an ultraviolet sensor, such as the Far Ultraviolet Space Telescope (FAUST), placed outside Earth's atmosphere. FAUST, which flew on Spacelab 1, will study astronomical radiation sources at ultraviolet wavelengths inaccessible to observers on Earth. Better knowledge of ultraviolet emission sources will lead to improved understanding of the life cycle of stars and galaxies throughout the universe. FAUST has flown on Spacelab 1.

THE ATLAS PROGRAM

ATLAS-1 is an important part of the long-term, coordinated research that makes up NASA's Mission to Planet Earth. The ATLAS-1 solar science instruments and several of the atmospheric science instruments (MAS, ATMOS, SSBUV) will fly on future ATLAS missions. Beyond its own science mission, a key goal of the ATLAS series is to provide calibration for NASA's Upper Atmosphere Research Satellite (UARS). Two ATLAS-1 instruments, ACR and SUSIM, have direct counterparts aboard UARS, while other instruments aboard each mission are closely related. Repeated flights of the ATLAS instruments, which can be carefully calibrated before and after each flight, will provide long-term calibration data sets for comparison with data from many satellite instruments and for long-term trend studies.

The next ATLAS flight, ATLAS-2, is scheduled for launch in spring 1993. Immediately after ATLAS-1 lands, the science teams for instruments flying on ATLAS-2 will begin recalibrating and preparing their instruments for reflight, while analyzing and interpreting their ATLAS-1 data.

INVESTIGATIONS INTO POLYMER MEMBRANE PROCESSING

The Investigations into Polymer Membrane Processing (IPMP), a middeck payload, will make its sixth Space Shuttle flight for the Columbus, Ohio-based Battelle Advanced Materials Center, a NASA Center for the Commercial Development of Space (CCDS), sponsored in part by the Office of Commercial Programs.

The objective of the IPMP is to investigate the physical and chemical processes that occur during the formation of polymer membranes in microgravity such that the improved knowledge base can be applied to commercial membrane processing techniques. Supporting the overall program objective, the STS-45 mission will provide additional data on the polymer precipitation process.

Polymer membranes have been used by industry in separations processes for many years. Typical applications include enriching the oxygen content of air, desalination of water and kidney dialysis.

Polymer membranes frequently are made using a two-step process. A sample mixture of polymer and solvents is applied to a casting surface. The first step involves the evaporation of solvents from the mixture. In the second step, a non-solvent (typically water) is introduced and the desired membrane is precipitated, completing the process. Previous flights of IPMP have involved the complete process (STS-41, -43, -48 and -42) and the evaporation step alone (STS-31). On the STS-45 mission, only the precipitation step will be performed.

On this mission, the process is initiated by STS-45 crewmembers. They will begin by accessing the two IPMP units in the stowage location in a middeck locker. By turning the valve on each unit, water vapor is infused into the sample container, initiating the process. Previous work indicates that the entire process should be complete after approximately 10 minutes, and the resulting membrane will not be influenced by gravitational accelerations at that time. The stowage tray containing the two units is then restowed for the duration of the flight.

Following the flight, the samples will be retrieved and returned to Battelle for testing. Portions of the samples will be sent to the CCDS's industry partners for quantitative evaluation consisting of comparisons of the membranes' permeability and selectivity characteristics with those of laboratory-produced membranes.

Lisa A. McCauley, Associate Director of the Battelle CCDS, is program manager for IPMP. Dr. Vince McGinness of Battelle is principal investigator.

GET AWAY SPECIAL EXPERIMENT

NASA's Get Away Special (GAS) program's goal is to provide access to space to everyone by offering individuals and organizations of all countries the opportunity to send scientific research and development experiments on board the Space Shuttle on a space-available basis.

Ten GAS experiments most recently flew on STS-42 in January 1992. To date, 77 GAS cans have flown on 17 missions. The GAS program began in 1982 and is managed by Goddard Space Flight Center. Clarke Prouty is GAS Mission Manager and Larry Thomas is Technical Liaison Officer.

(G-229) Experiment in Crystal Growth:
NASA Technical Manager: Dave Peters

This experiment was designed to grow crystals of gallium arsenide (GaAs). GaAs is a versatile electronic material used in high-speed electronics and optoelectronics. The crystal grown on this mission will be 1 inch in diameter by 3.5 inches long and will be grown using a gradient freeze growth technique.

The payload is entirely self-sufficient and includes its own power system, growth system and control and data acquisition systems. The crystal growth will last nearly 11 hours and will be initiated by an astronaut closing a switch. This is the only human interaction necessary with this payload.

This experiment is a reflight of a successful GAS experiment conducted on STS-40 in June 1991, but with additional features included to enhance the ability to analyze convection effects on crystal growth in microgravity.

The payload was designed and constructed at GTE Laboratories in Waltham, Maine, and is jointly sponsored by GTE, the U.S. Air Force Wright Research and Development Center Materials Laboratory, Dayton, Ohio, and the Microgravity Science and Applications Division of the NASA Office of Space Science and Applications. The Space Experiment Division of NASA's Lewis Research Center, Cleveland, manages the project. Project manager is Dr. Richard W. Lauver.

This experiment is part of a comprehensive program that involves a comparative study of crystal growth under a variety of terrestrial conditions in addition to crystal growth in microgravity aboard the Space Shuttle. Scientists from each research institution will contribute to characterization of the space-grown crystals.

SHUTTLE AMATEUR RADIO EXPERIMENT (SAREX)

The Shuttle Amateur Radio Experiment is designed to demonstrate the feasibility of amateur shortwave radio contacts between the Space Shuttle and ground amateur radio operators, often called ham radio operators. SAREX also serves as an educational opportunity for schools around the world to learn about space first hand by speaking directly to astronauts aboard the Shuttle via ham radio. Contacts with certain schools are included in planning the mission.

In addition, if the Russian Mir Space Station becomes visible to the STS-45 crew during the mission, SAREX may be used to attempt a conversation with the Mir cosmonauts, who also have a ham radio aboard.

Four of the STS-45 crew members are licensed amateur radio operators: Mission Specialists Dave Leestma, call sign N5WQC; Kathy Sullivan, call sign N5YVV; Pilot Brian Duffy, call sign N5WQW; and Payload Specialist Dirk Frimout, call sign ON1AFD. Frimout and Sullivan are fluent in several European languages and hope to make contacts in that part of the world. However, STS-45's 57-degree inclination will place the spacecraft in an orbit that will allow worldwide contact possibilities, including high latitude areas not normally on the Shuttle's groundtrack.

Ham operators may communicate with the Shuttle using VHF FM voice transmissions, a mode that makes contact widely available without the purchase of more expensive equipment. The primary frequencies to be used during STS-45 are 145.55 MHz for transmissions from the spacecraft to the ground and 144.95 MHz for transmissions from the ground to the spacecraft.

SAREX has flown previously on Shuttle missions STS-9, STS-51F, STS-35 and STS-37. The equipment aboard Atlantis for STS-45 will include a low-power, hand-held FM transceiver, spare batteries, a headset, an antenna designed to fit in the Shuttle's window, an interface module and an equipment cabinet.

SAREX is a joint effort of NASA, the American Radio Relay League (ARRL), the Amateur Radio Satellite Corp. and the Johnson Space Center Amateur Radio Club. Information about orbital elements, contact times, frequencies and crew operating times will be available from these groups during the mission and from amateur radio clubs at other NASA centers.

Ham operators from the JSC club will be operating on HF frequencies and the AARL (W1AW) will include SAREX information in its regular HF voice and teletype bulletins. The Goddard Space Flight Center Amateur Radio Club will operate 24 hours a day during the mission, providing information on SAREX and retransmitting live Shuttle air-to-ground communications.

STS-45 SAREX Operating Frequencies

Location	Shuttle Transmission	Shuttle Reception
U.S., Africa,	145.55 MHz	144.95 MHz
South America	145.55	144.97
and Asia	145.55	144.91
Europe	145.55 MHz	144.95 MHz
	145.55	144.75
	145.55	144.70

Goddard Amateur Radio Club Operations
(SAREX information and Shuttle audio broadcasts)

3.860 MHz	7.185 MHz
14.295 MHz	21.395 MHz
28.395 MHz	

SAREX information also may be obtained from the Johnson Space Center computer bulletin board (JSC BBS), 8 N 1 1200 baud, at 713/483-2500 and then type 62511.

RADIATION MONITORING EQUIPMENT-III (RME)

The Radiation Monitoring Equipment-III measures ionizing radiation exposure to the crew within the orbiter cabin. RME-III measures gamma ray, electron, neutron and proton radiation and calculates in real time exposure in RADS-tissue equivalent. The information is stored in memory modules for post-flight analysis.

The hand-held instrument will be stored in a middeck locker during flight except for activation and memory module replacement, done every 2 days. RME-III will be activated by the crew as soon as possible after reaching orbit and operated throughout the mission. A crew member will enter the correct mission elapsed time upon activation. RME-III is sponsored by the Department of Defense in cooperation with NASA.

VISUAL FUNCTION TESTER-II (VFT-II)

The objective of the Visual Function Tester-II experiment is to measure changes in a number of vision parameters in the vision of subjects exposed to microgravity. VFT-II consists of a hand-held battery-powered testing device which incorporates a binocular eyepiece and uses controlled illumination to present a variety of visual targets for subject testing. The device measures changes in the contrast ratio threshold in the vision of subjects exposed to prolonged microgravity. Test results are read on a display and recorded on data sheets. VFT-II has flown previously on Shuttle missions STS-27, STS-28 and STS-36.

On STS-45, the payload specialists will be the primary subjects for VFT-II and will perform testing at 2 weeks and 1 week prior to the flight. In flight, they will be tested each day. Post-flight, they will be tested 2 days after landing and 1 week after landing. VFT-II is sponsored by the Air Force Space Systems Division, Los Angeles.

CLOUDS-1A

The overall objective of the CLOUDS-1A program is to quantify the variation in apparent cloud cover as a function of the angle at which clouds of various types are viewed and to develop meteorological observation models for various cloud formations.

The CLOUDS-1A experiment is stowed in a middeck locker and consists of a Nikon F3/T camera assembly and film. On-orbit, a crew member will take a series of high resolution photographs of individual cloud scenes, preferably severe weather and high "wispy" cirrus clouds, over a wide range of viewing angles.

SPACE TISSUE LOSS (STL)

Space Tissue Loss is a life sciences experiment that studies cell growth during spaceflight. The hardware developed for this experiment allows drugs to be added and the response tested at any preprogrammed time during the mission. The objective of the experiment is to study the response of muscle, bone and endothelial cells by evaluating various parameters including shape, cytoskeleton, membrane integrity and metabolism, activity of enzymes that inactivate proteins and the effects or change of response to various drugs on these parameters.

The payload consists of a large tray assembly which can be refurbished and replaced. The tray fits inside a standard middeck locker. All fluids and cells within the tray have three levels of containment to assure that nothing escapes from the package into the middeck. The self-contained computer system is preprogrammed for medium and gas delivery to the cells, environmental monitoring of temperature and other important parameters, timed collection of medium and/or cells and cell fixation.

STS-45 CREW BIOGRAPHIES

Charles F. Bolden, Jr., 45, Col., USMC, will serve as Commander. Selected as an astronaut in 1980, Bolden was born in Columbia, S.C., and will be making his third space flight.

Bolden graduated from C.A. Johnson High School in Columbia in 1964; received a bachelor of science in electrical science from the Naval Academy in 1968; and received a master of science in systems management from the University of Southern California in 1978.

Bolden was designated a naval aviator in 1970 and flew more than 100 sorties in Vietnam in the A-6A Intruder. In 1979, he graduated from the Naval Test Pilot School. He later served as a test pilot for the A-6E, EA-6B and A-7C/E aircraft until his selection by NASA.

His first space flight was as pilot of STS-61C in January 1986. He next served as pilot for STS-31 in April 1990. Bolden has logged more than 267 hours in space.

Brian Duffy, 38, Lt. Col., USAF, will serve as Pilot. Selected as an astronaut in 1985, Duffy was born in Boston, Mass., and will be making his first space flight.

Duffy graduated from Rockland High School, Rockland, Ma., in 1971; received a bachelor of science in mathematics from the Air Force Academy in 1975; and received a master of science in systems management from the University of Southern California in 1981.

Duffy completed pilot training in 1976 and flew the F-15 out of Langley Air Force Base, Hampton, Va., until 1979. He graduated from the Air Force Test Pilot School in 1982 and served as Director of F-15 flight tests at Eglin Air Force Base, Fla., until his selection by NASA.

At NASA, Duffy has participated in Shuttle software development, served as Technical Assistant to the Director of Flight Crew Operations and worked as CAPCOM or spacecraft communicator for several Shuttle missions in Mission Control.

Duffy has logged more than 3,000 flying hours in more than 25 different types of aircraft.

Kathryn D. Sullivan, 40, will serve as Mission Specialist 1. Selected as an astronaut in 1978, Sullivan considers Woodland Hills, Calif., her hometown and will be making her third space flight.

Sullivan graduated from Taft High School, Woodland Hills, in 1969; received a bachelor of science in Earth sciences from the University of California at Santa Cruz in 1973; and received a doctorate in geology from Dalhousie University, Halifax, Nova Scotia, in 1978.

Sullivan first flew on STS-41G in October 1984. Her second flight was on STS-31 in April 1990. Sullivan has logged more than 318 hours in space.

David C. Leestma, 42, Capt., USN, will serve as Mission Specialist 2. Selected as an astronaut in 1980, Leestma was born in Muskegon, Mich., and will be making his third space flight.

Leestma graduated from Tustin High School, Tustin, Calif., in 1967; received a bachelor of science in aeronautical engineering from the Naval Academy in 1971; and received a master of science in aeronautical engineering from the Naval Postgraduate School in 1972.

Leestma first flew on STS-41G in October 1984 and on STS-28 in August 1989. Leestma has logged more than 318 hours in space.

Michael Foale, 35, will serve as Mission Specialist 3. Selected as an astronaut in 1987, Foale considers Cambridge, England, his hometown and will be making his first space flight.

Foale graduated from Kings School, Canterbury, England, in 1975; received a bachelor of arts in physics from the University of Cambridge, Queens' College, in 1978; and received a doctorate in laboratory physics from Queens' College in 1982.

Prior to his selection as an astronaut, Foale worked for NASA as a payloads officer in Mission Control. As an astronaut, his assignments have included work in the Shuttle Avionics Integration Laboratory and on crew rescue and operations planned for Space Station Freedom.

Dirk D. Frimout, 51, will serve as Payload Specialist 1. A European Space Agency staff member, Frimout was born in Poperinge, Belgium, and will be making his first space flight.

Frimout graduated from Atheneum secondary school in Ghent, Belgium; received a bachelor's degree in electrotechnical engineering from the State University of Ghent in 1963; received a doctorate in applied physics from the University of Ghent in 1970; and performed post-doctorate work at the University of Colorado Laboratory of Atmospheric and Space Physics in 1971.

Frimout worked at the Belgian Institute for Space Aeronomy as head of section instrumentation from 1965-1978. From 1978-1984, he served ESA as crew activities coordinator and experiment coordinator for Spacelab 1. From 1984-1989, he worked in the microgravity division of ESTEC and is a senior engineer in the Payload Utilization Department of the Columbus Directorate for ESA.

Byron K. Lichtenberg, 44, will serve as Payload Specialist 2. First selected as a payload specialist by NASA in 1978, Lichtenberg was born in Stroudsburg, Pa., and will be making his second space flight.

Lichtenberg graduated from Stroudsburg High School in 1965; received a bachelor of science in aerospace engineering from Brown University in 1969; received a master of science in mechanical engineering from the Massachusetts Institute of Technology (MIT) in 1975; and received a doctorate in biomedical engineering from MIT in 1979.

Lichtenberg joined the U.S. Air Force in 1969 and later earned wings as an F-4 fighter pilot, logging more than 2,500 flying hours on 138 combat missions. After discharge from the Air Force, he attended graduate school at MIT. Lichtenberg first flew as a payload specialist on STS-9 Spacelab-1 in November 1983, logging 10 days in space.

STS-45 MISSION MANAGEMENT

NASA HEADQUARTERS, WASHINGTON, D.C.

Office of Administrator

Richard H. Truly - Administrator
Aaron Cohen - Deputy Administrator (Acting)
Roy S. Estess - Special Assistant

Office of Space Flight

Dr. William Lenoir - Associate Administrator
Thomas E. Utsman - Deputy Associate Administrator

Office of Space Science

Dr. Lennard A. Fisk - Associate Administrator
Alphonso V. Diaz - Deputy Associate Administrator
Robert Benson - Director, Flight Systems Division
Earl Montoya - Program Manager
Dr. Shelby Tilford - Director, Earth Science and Applications Division
Dr. Jack Kaye - Program Scientist
George Esenwein - Experiments Program Manager
Dr. Charles Pellerin - Director, Astrophysics Division
Dr. Barry Welsh - Program Scientists, FAUST
Dr. George Withbroe - Director, Space Physics Division
Lou Demas - Chief, Space Physics Flight Programs Branch

Office of Commercial Programs

John G. Mannix - Assistant Administrator
Richard H. Ott - Director, Commercial Development Division
Garland C. Misener - Chief, Flight Requirements and Accommodations
Ana M. Villamil - Program Manager, Centers for the Commercial Development of Space

Office of Safety & Mission Quality

George A. Rodney - Associate Administrator
Charles Mertz - Deputy Associate Administrator (Acting)
Richard U. Perry - Director, Programs Assurance Division

KENNEDY SPACE CENTER, FLA.

Robert L. Crippen - Director
Jay Honeycutt - Director, Shuttle Management and Operations
Robert B. Sieck - Launch Director
Conrad G. Nagel - Atlantis Flow Manager
John T. Conway - Director, Payload Management and Operations
P. Thomas Breakfield - Director, STS Payload Operations
Joanne H. Morgan - Director, Payload Project Management
Mike Kinnan - STS-45 Payload Processing Manager

MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.

Thomas J. Kee - Director
Dr. J. Wayne Littles - Deputy Director
Harry G. Craft, Jr. - Manager, Payload Projects Office
Anthony O'Neil - Mission Manager
Ms. Teresa Vanhooser - Assistant Mission Manager
Gerald Maxwell - Assistant Mission Manager
Dr. Marsha Torr - Mission Scientist
Paul Craven - Assistant Mission Scientist
Robert Beaman - Chief Engineer
Dr. George McDonough - Director, Science and Engineering
James H. Ehl - Director, Safety and Mission Assurance
Alexander A. McCool - Manager, Shuttle Projects Office
Alexander A. McCool - Acting Manager, Space Shuttle Main Engine Project
Victor Keith Henson - Manager, Redesigned Solid Rocket Motor Project
Cary H. Rutland - Manager, Solid Rocket Booster Project
Gerald C. Ladner - Manager, External Tank Project

JOHNSON SPACE CENTER, HOUSTON

Paul J. Weitz - Director (Acting)
Paul J. Weitz - Deputy Director
Daniel Germany - Manager, Orbiter and GFE Projects
Donald R. Puddy - Director, Flight Crew Operations
Eugene F. Kranz - Director, Mission Operations
Henry O. Pohl - Director, Engineering
Charles S. Harlan - Director - Safety, Reliability and Quality Assurance
Sharon Castle - ATLAS-1 Payload Manager

GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.

Dr. John M. Klineberg - Director
Dr. Vincent V. Salomonson - Director, Earth Sciences
Dr. Franco Einaudi - Chief, Laboratory for Atmospheres
Dr. Mark R. Schoeberl - Head, Atmospheric Chemistry and Dynamics
Ernest Hilsenrath - SSBUV Principal Investigator
Donald Williams - SSBUV Mission Manager
Clarke Prouty - GAS Mission Manager
Larry Thomas - Technical Liaison Officer

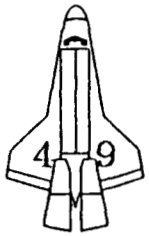
STENNIS SPACE CENTER, BAY ST. LOUIS, MISS.

Gerald W. Smith - Director (Acting)
Gerald W. Smith - Deputy Director
J. Harry Guin - Director, Propulsion Test Operations

AMES-DRYDEN FLIGHT RESEARCH FACILITY, EDWARDS, CALIF.

Kenneth J. Szalai - Director
T. G. Ayers - Deputy Director
James R. Phelps - Chief, Space Support Office

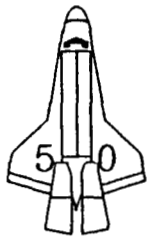
Upcoming Space Shuttle Flights



Endeavour (EPD – late April)

1992
Pad 39-B

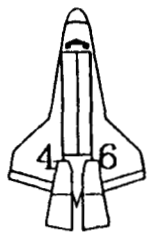
Endeavour's first flight. Targeted for May. Payload includes Intelsat VI-R, ASEM. 28.5 degrees inclination/228 st. miles. Seven days. Crew includes Dan Brandenstein; Kevin P. Chilton; Thomas D. Akers; Richard J. Hieb; Bruce E. Melnick; Kathryn C. Thornton; Pierre J. Thuot.



Columbia

1992
Pad 39-A

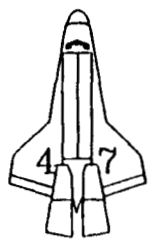
Launch targeted for June. U.S. Microgravity Laboratory-1. 28.5 degrees inclination/184 st. miles. 13 days. Crew includes Richard Richards; Kenneth D. Bowersox; Bonnie J. Dunbar; Ellen S. Baker; Carl J. Meade; Lawrence J. Delucas; Eugene H. Trinh. Longest Shuttle mission yet planned.



Atlantis

1992
Pad 39-B

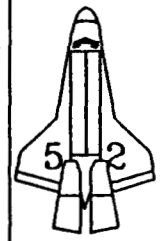
Launch targeted for August. Tethered Satellite System-01, EURECA (European Retrievable Carrier). 28.5 degrees inclination/265 st. miles. Seven days. Crew includes Loren Shriver; Andrew M. Allen; J. A. Hoffman; Franklin R. Chang-Diaz; Marsha Ivins; Claude Nicollier; Franco Malerba.



Endeavour

1992
Pad 39-B

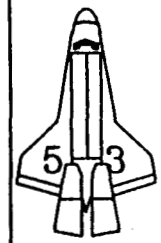
Launch targeted for September. Spacelab-J, a microgravity material science and processing mission. 57 degrees inclination/187 st. miles. Seven days. Crew: Robert L. Gibson; Curtis L. Brown; Mark C. Lee; Jerome Apt; N. Jan Davis; Mae C. Jemison; Mamoru Mohri.



Columbia

1992
Pad 39-B

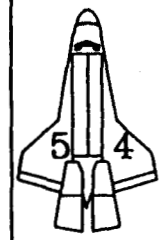
Launch targeted for September. Among payloads are LAGEOS-II, USMP-01, CANEX-02, ASP, IRIS. 28.5 degrees inclination/185 st. miles. Nine days. James D. Wetherbee; Michael A. Baker; William M. Shepherd; Tamara E. Jernigan; Charles Lacy Veach; Steve MacLean.



Discovery

1992
Pad 39-A

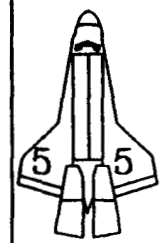
Launch targeted for December. Dedicated DOD mission. 57 degrees inclination/230 st. miles. Four days. Crew: David M. Walker; Robert D. Cabana; Guion S. Bluford; James S. Voss; Michael R. U. Clifford.



Endeavour

1993
Pad 39-B

Launch targeted for January. Tracking and Data Relay Satellite-06. 28.5 degrees inclination/185 st. miles. Six days. Crew: John H. Casper; Donald R. McMonagle; Gregory J. Harbaugh; Mario Runco; Susan J. Helms.



Columbia

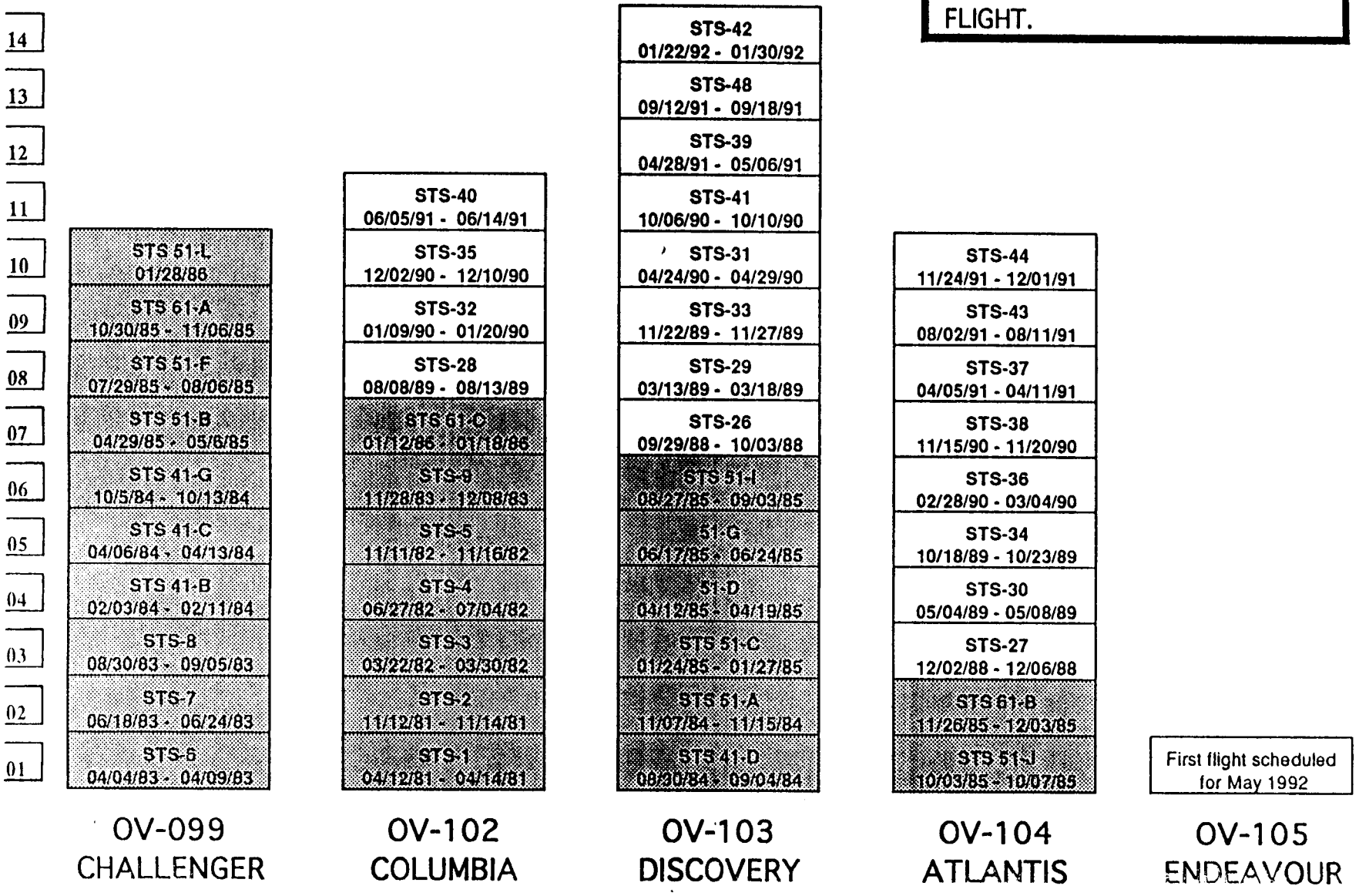
1993
Pad 39-A

Launch targeted for March. Second German Spacelab mission. 28.5 degrees inclination/185 st. miles. Nine days. Crew: Steve Nagel; Tom Henricks; Jerry L. Ross; Charles Precourt; Bernard Harris Jr.; Hans Schlegel; Ulrich Walter.

SOME NOTES ON THIS SCHEDULE: This is an unofficial Space Shuttle launch schedule covering the period from May 1992 through March 1993. Crew listings name commanders first, then pilots, then mission and payload specialists. This flight listing is based on the January 1992 Mixed Fleet Manifest. This graph is prepared by the Kennedy Space Center Public Information Office and is dated Feb. 29, 1992. Abbreviations used include: EPD = Earliest Possible Date. Official launch dates are set at the Flight Readiness Review. TBD = To Be Determined.

SHUTTLE FLIGHTS AS OF FEBRUARY 1992

45 TOTAL FLIGHTS OF THE SHUTTLE SYSTEM - 20 MISSIONS CONDUCTED SINCE RETURN TO FLIGHT.



NASA FactSheet

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

Jim Sahli/Allen Kenitzer
Marshall Space Flight Center
Huntsville, Ala.
Phone: 205/544-0034

March 1992

HOW TO COVER STS-45 ATLAS-1 SPACELAB

For eight days in late March, NASA will transform the Shuttle Atlantis into an atmospheric science laboratory (ATLAS-1). Atlantis's crew of seven will gather new information to gain a better understanding of how the atmosphere reacts to natural and human-induced atmospheric changes. That knowledge will help scientists identify measures that will keep planet Earth suitable for life for future generations.

ATLAS-1 is the first in a series of Atmospheric Laboratory for Applications and Science missions managed and controlled from NASA's Marshall Space Flight Center in Huntsville, Ala. Scientists from two continents have contributed to the experiments for the ATLAS-1 flight aboard Shuttle mission STS-45 and many will participate in the mission from the Marshall Center.

ATLAS-1 will be considerably different from other Space Shuttle missions. Therefore, NASA news operations and services will differ significantly from most other Space Shuttle flights.

BACKGROUND

The eight-day STS-45/ATLAS-1 mission will be a joint effort between controllers and scientists at the Spacelab Mission Operations Control facility at the Marshall Space Flight Center in Huntsville, Ala., and the Mission Control Center at the Johnson Space Center in Houston.

While Mission Control will be responsible for standard Shuttle flight operations, all ATLAS-1 science operations, which constitute the vast majority of flight activities, will be directed from the Spacelab Mission Operations Control facility at Marshall.

(More)

From the Huntsville facility, controllers and scientists will plan and direct science operations around the clock throughout the mission. They will send commands directly to the spacecraft, receive and analyze scientific data being transmitted to the ground from the Shuttle, and talk with the science astronauts on an air-to-ground circuit separate from the circuit used by Mission Control to talk with the flight crew.

ATLAS-1 experiments and equipment have been provided by scientists from NASA, the European Space Agency, and research laboratories in the United States and Europe. Together, chief scientists (called principal investigators) for each of the experiments form the ATLAS-1 Investigators Working Group which guides science planning for the mission.

COVERING ATLAS-1 FROM THE MARSHALL SPACE FLIGHT CENTER

The Marshall Space Flight Center has prime responsibility for disseminating ATLAS-1 science mission information. Media desiring to cover the ATLAS-1 science mission should note that most of that activity will be focused in Huntsville.

While media covering from Huntsville will have access to media services normally available at all NASA mission news centers, access to some significant events and services will be available only at the Marshall Space Flight Center. They include:

- Access to ATLAS-1 mission management, control team members and scientists who are conducting research during the mission.

- Access to the Spacelab Mission Operations Control facility during the mission.

- Access to simulators where the science crew trained for the mission.

News Center: To accommodate media coverage of the ATLAS-1 science mission, a full-service news operation will be established at the Marshall Center beginning prior to launch and continuing to operate throughout the mission. Hours of operation are 4 a.m. to 8 p.m. (CST).

Facilities: The ATLAS-1 news center provides media work stations, each equipped with credit-card telephones, and a capability to monitor NASA Select Audio, Mission Audio, and both air/ground circuits. Overhead monitors provide NASA Select television, mission timing, tracking, and experiment status displays. For media desiring to bring satellite trucks or other mobile facilities, parking and hookups are provided adjacent to the news center. Hookups include telephone, electrical power, as well as selected audio and video feeds.

(More)

Should news media desire a commercial phone line in the ATLAS-1 news center, they should contact the Marshall Media Services Office immediately for further information.

Staffing: The Marshall Center news center will be staffed by NASA public affairs officers knowledgeable about the ATLAS-1 mission, public affairs officers representing the instruments aboard the Spacelab mission, and technical experts.

Interviews: An interview desk in the news center will arrange and schedule both face-to-face and telephone interviews with mission participants.

Photo Releases: A photo desk in the news center will provide throughout the mission photographs of on-orbit and Huntsville control center activities.

Briefings: ATLAS-1 status briefings will originate from the Marshall Center at 1 p.m. daily throughout the mission.

Mission Data Displays: Media covering from the ATLAS-1 news center at Marshall will have access to mission timing, tracking, and experiment status displays.

Visits to Operational Areas: Visits by media to mission operational areas, including the Spacelab Mission Operations Control facility, can be arranged at the news center.

Status Reports: Written reports on the status of the ATLAS-1 mission will be issued twice daily at 6 a.m. and 6 p.m. (CST), from the Spacelab Mission Operations Control facility. These reports will be available in the news center.

Broadcast News Service: An ATLAS-1 broadcast news service will be maintained by the ATLAS-1 news center. It will contain brief, up to date status reports on the ATLAS-1 science mission. The broadcast news service can be reached by dialing (205) 544-6397.

Mission Programming: Around-the-clock commentary on the ATLAS-1 mission will emanate from the Spacelab Mission Operations Control facility and will be integrated into NASA Select television and Mission Audio programming.

Mission Televisin: An uninterrupted feed of the payload control center television program will be available to media covering from the Marshall Center.

Television coverage emanating from the Marshall Center will include television from the Space Shuttle, the Shuttle's payload bay cameras, and from the Payload Control Room and research areas of the Spacelab Mission Operations Control facility; coverage of daily briefings; and special programming.

(More)

Special programming includes a daily summary of ATLAS-1 activities for the previous 24-hours. The program, called "Today in Space," will originate from the Marshall Center, live on NASA Select at approximately Noon CST. It will include video highlights as well as comments and discussions by mission participants.

Stand-up Locations: There are a number of locations for television stand-ups for media covering from Marshall, including a 1/15-scale Space Shuttle model, a full-scale mock-up of the Space Shuttle launch vehicle, and stand-up locations overlooking the Payload Control Room and the Science Operating Areas.

Audio Rebroadcast: NASA Select audio is rebroadcast in the Huntsville area at a frequency of 173.025 Mhz.

Accreditation: Prior accreditation is not required for media covering from the Marshall Center. It is recommended that international media and non-local news media contact the Public Affairs Office at (205) 544-0034 in advance of their arrival to ensure any special requirements are met. Media work space and facilities will be allocated in advance of the mission on a first-come, first-served basis.

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NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

Jim Sahli
Marshall Space Flight Center
Huntsville, Ala.
(Phone: 205/544-0034)

For Release

March 13, 1992

RELEASE NO: 92-51

NOTE TO EDITORS/NEWS DIRECTORS

NASA is scheduled to launch Space Shuttle mission STS-45, the 46th Shuttle flight, in late March. The eight-day mission is the first in a series of Atmospheric Laboratory for Applications and Science missions (ATLAS-1). Scientists will collect information to gain a better understanding of how the Earth's atmosphere reacts to natural and human-induced atmospheric changes.

The current planned launch date for Atlantis is March 23 at 7:01 a.m. (CST).

ATLAS-1 mission operations will differ from other Shuttle missions, and NASA news operations will be different as well. An ATLAS-1 news center will be established at the Spacelab Mission Operations Control facility at NASA's Marshall Space Flight Center in Huntsville, Ala., where mission science operations will be controlled. The attached fact sheet provides information on how news media can best cover the science mission.

-More-

News media planning to cover the mission from the Marshall news center who desire workspace and telephones, have special requirements, or desire additional information should contact Marshall's Media Services Office at (205) 544-0034.

Coverage of the launch of Columbia and the STS-45 mission will be carried on NASA Select Television, which is available on Satcom F-2R, Transponder 13, C-band, located at 72 degrees west longitude, frequency 3960.0 MHz, vertical polarization, audio monaural 6.8 MHz.

Enclosed is a press vehicle to get you entrance to Redstone Arsenal throughout the mission. The pass will also serve as your parking permit in spaces set aside for news media parking adjacent to the Spacelab news center.

Also included are fact sheets to better inform you on the ATLAS-1 mission. They include the **Spacelab Mission Operations Control Center**, the **Payload Crew Training Complex** and the **ATLAS-1** mission fact sheet.

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NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

March 26, 1992

NOTE TO EDITORS:
SMALL EXPENDABLE-TETHER DEPLOYER SYSTEM

Attached is a U.S. Air Force announcement released late this afternoon regarding launch of the Delta II expendable rocket. NASA's Small Expendable-tether Deployer System (SEDS) is a secondary payload on this vehicle. The one-day launch postponement means that the initiation of SEDS deployment will now occur no earlier than 11:16 p.m. EST on March 28.

# # #

NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

Jerry Berg
Marshall Space Flight Center
Huntsville, Ala.
(Phone: 205/544-6540 or -0034)

March 26, 1993

Release No: 93-24

NOTE TO EDITORS: SMALL EXPENDABLE-TETHER DEPLOYER SYSTEM

The flight of NASA's Small Expendable-tether Deployer System (SEDS) has been rescheduled for no earlier than 10:18 p.m. (EST) March 27. The SEDS tether system will be a secondary payload on a U.S. Air Force Delta II rocket to be launched from Cape Canaveral Air Force Station, Fla.

Deployment of the SEDS payload is planned to begin approximately 60 minutes after the Delta launch, and will last for an additional 1 hour and 40 minutes.

As was the case for two previous launch attempts, there will be no news center operation for the SEDS flight demonstration. However, following deployment, news media with questions may call 407/867-2814. A status report concerning the outcome of the SEDS demonstration will be distributed by fax as soon as possible after completion of the mission to media who have provided a fax number to the Marshall Space Flight Center Media Services office at 205/544-0034.

# # #

Dave Drachlis, Mike Simmons
Marshall Space Flight Center
Huntsville, Ala.
(Phone: 205/544-6538 or 544-0037)

May 7, 1993

RELEASE: 93-46

CONFERENCE COMMEMORATES SKYLAB, SPACELAB, SPACE STATION

The International Conference on Skylab, Spacelab, Space Station, and Beyond will convene in Huntsville, Ala., May 13 in the North Hall of the Von Braun Civic Center.

The day-long event will commemorate the 20th anniversary of the launch of Skylab, the world's first space station; the 10th anniversary of the first mission of Spacelab, a research laboratory carried by the Space Shuttle; and the 10th anniversary of Space Station concepts development.

The conference will bring together astronauts, scientists, engineers and managers from around the world who participated in these programs, and will serve as a platform for discussion of future missions as space exploration continues to evolve from expertise and knowledge gained from the programs.

At 8:15 a.m., Jack Lee, director of NASA's Marshall Space Flight Center in Huntsville, will open the conference with welcoming remarks. The Marshall Center was responsible for development of Skylab, was the agency's lead organization for development of the European Space Agency-provided Spacelab, and is responsible for managing many of the Spacelab missions. The center also has had a key role in Space Station development.

Seven of the nine Skylab astronauts are also scheduled to participate in the conference. (Editors Note: The Skylab crew members will be available to meet with reporters at 10 a.m., May 13, in the Rehearsal Hall, on the second floor over the VBCC North, where they will talk about their experiences and answer questions.)

A conference overview session at 8:30 a.m. will review initiation and key challenges of each of the Skylab, Spacelab and Space Station programs. Key government and contractor management personnel who participated in the programs will give their views on each programs goals and accomplishments.

- more -

A spacecraft systems seminar will address critical spacecraft and transporation systems required to support human space exploration capabilities. It will be held at 10:30 a.m.

A science session at 1:30 p.m. will review major science accomplishments of Skylab and Spacelab and will highlight the opportunities for future science investigations on Space Station.

And, beginning at 4:00 p.m., astronaut crew members from Skylab and Spacelab will discuss from their personal experiences - the spectrum of activities and accomplishments involved in those programs.

Exhibits of space hardware and other memorabila from the Skylab, Spacelab, and Space Station development programs will be on display throughout the conference in the VBCC's East Exhibit Hall.

A special Von Braun Exploration Seminar will cap the day's activities with a presentation on the Challenges of Human Space Flight at 8 p.m. at the U.S. Space and Rocket Center. This session is open to the public free of charge, and the featured speaker will be Skylab astronaut Joseph Kerwin.

- end -

NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

David B. Drachlis
Marshall Space Flight Center
Huntsville, Ala.
(Phone: 205/544-0034)

Sterling North
International Space University
(Phone: 205/890-7400

July 14, 1993

RELEASE NO: 93-83

INTERNATIONAL SPACE UNIVERSITY STUDENTS
TO TALK WITH SHUTTLE CREW IN ORBIT

Students attending the International Space University's 1993 Summer Session are scheduled to talk with STS-51 astronauts as they orbit the Earth aboard the Space Shuttle Discovery July 19.

Among Discovery's five crew members is Mission Specialist James Newman, the first graduate of the International Space University to fly in space.

The event will originate from NASA's Marshall Space Flight Center in Huntsville, Ala. Pending an on-time launch on July 17, the event is scheduled to begin at 12:10 p.m. central time with welcoming remarks by Marshall Center Director Jack Lee, and

- more -

an introduction by International Space University Vice President for Academic Affairs, Dr. George Haskell.

The International Space University is a non-profit, educational institution specializing in international and multi-disciplinary advanced space studies programs. The ISU 1993 Summer Session, including more than 100 students from 30 nations, is being hosted by the University of Alabama in Huntsville.

News media desiring to cover the event should report to the Marshall Center Television Studio, in Building 4207, by 11:45 a.m. on July 19. The event will be carried live on NASA Select Television, Satcom F2R, Transponder 13, situated at 72 degrees west longitude. Mission constraints could necessitate rescheduling or cancellation of the event.

- 30 -

MSFC STATUS REPORT:

Small Expendable-tether Deployer System (SEDS)

The planned launch of an Air Force Delta II rocket carrying NASA's Small Expendable-tether Deployer System as a secondary payload was scrubbed Sunday night at Cape Canaveral AFS, Fla., due to upper-level winds being unacceptably high.

Air Force officials said the next launch attempt would be March 29, with a 28-minute launch window opening at 10:09 p.m. EST.

Prepared by: Jerry Berg, MSFC PAO
March 28, 1993
10:45 p.m.

NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

Jim Sahli
Marshall Space Flight Center
Huntsville, Ala.
(~~Phone: 205~~/544-6528 or -0034)

Dec. 22, 1993

RELEASE NO: 93-176

NASA'S MARSHALL SPACE FLIGHT CENTER ANNOUNCES
PERSONNEL AND ORGANIZATIONAL CHANGES

Jack Lee, director of NASA's Marshall Space Flight Center in Huntsville, Alabama has announced several personnel and organizational changes at the Center.

George Hopson, manager of the Marshall Center Space Station Projects Office, has been appointed deputy director for Space Systems in the Center's Science and Engineering Directorate.

Axel Roth, deputy manager, Space Station Projects Office, will become deputy director of Program Development effective upon the retirement of William Snoddy at the end of December.

B. Ron McCullar, deputy manager, Program Engineering Office, Space Station Freedom Directorate, NASA Headquarters, has been appointed Director of the Marshall Facilities Office in the Institutional and Program Support Directorate. He will replace Harold Coldwater who will retire from federal service on January 3, 1994.

Dr. George Fichtl is appointed manager, Microgravity Projects in the Space Systems Projects Office. Prior to his appointment, he had been deputy director of the Space Science Laboratory.

Ralph Hoodless, Jr., is appointed manager, Automated Rendezvous and Capture Project in the Space Systems Projects Office. Prior to this appointment he had been deputy manager, Advanced Launch System in the Heavy Lift Launch Vehicle Definition Office.

Rein Ise is appointed manager, Earth and Space Sciences Projects in the Space Systems Projects Office. He had been manager, Science and Applications Projects in the Payload Projects Office.

William E. Taylor is appointed manager, Space Station Furnace Facility, Microgravity Projects in the Space Systems Projects Office. Prior to this, he had been manager, Advanced X-ray Astrophysics Facility-S in the Observatory Projects Office.

-More-

Lowell Zoller is appointed associate director, Science and Engineering Directorate. Prior to this, he had been manager, Acquisition and Business Management, Heavy Lift Launch Vehicle Definition Office.

Lee also announced an organizational restructure of the Program Development Directorate.

The Heavy Lift Launch Vehicle (HLLV) activities, advanced transportation systems definition, and related development efforts are being consolidated within Program Development and will be pursued by the new Advanced Transportation System Office and directed by Armis Len Worlund. Previously, Worlund served as the Science and Engineering Chief Engineer for the HLLV definition effort.

The Research and Tecnology Office is being relocated from the Science and Engineering Directorate to the Program Development Directorate. Dr. Gabriel Wallace will continue as director of this office. The Technogy Utilization Office, directed by Ismail Akbay, will also become part of the Research and Technology Office.

The Institutional and Program Support Directorate's environmental activity is being moved out of the Facilities Office and established as a separate organization called Environmental Engineering and Management Office. Dr. Rebecca McCaleb heads this office.

-30-

NASA News

National Aeronautics and
Space Administration

Washington, D.C. 20546
AC 202 453-8400

ISY

For Release

Edward Campion
Headquarters, Washington, D.C.
(Phone: 202/358-1778)

June E. Malone
Marshall Space Flight Center, Huntsville, Ala.
(Phone: 205/544-7061)

February 28, 1994

RELEASE: 94-32

SUPER LIGHTWEIGHT EXTERNAL TANK TO BE USED BY SHUTTLE

Marshall Space Flight Center (MSFC), Huntsville, Ala., management has received approval to proceed with the development and manufacturing of an improved, lighter version of the Space Shuttle External Tank. The Super Lightweight External Tank will be fabricated of aluminum alloys and incorporate an orthogrid design for the panels which together make the tank 8,000 pounds lighter than the current configuration.

This reduction in weight can be used to increase Shuttle performance, placing typical payloads into higher orbits or at higher inclination to the Equator or placing heavier payloads into low Earth orbit. The Super Lightweight Tank development and production will enhance the Space Shuttle's capability to support the Space Station deployment.

The existing contract for the tank with Martin Marietta will be modified, enabling the contractor to make the required changes. The first Super Lightweight Tank is scheduled for delivery in 1997, with External Tank-96 projected as the first aluminum lithium tank.

Testing of the new configuration will be accomplished at MSFC. The program development cost is estimated at $172.5 million. Each Super Lightweight Tank produced will cost approximately $59 million.

- end -

NASA News

National Aeronautics and
Space Administration

George C. Marshall Space Flight Center
Huntsville, Alabama 35812

For Release:

JUNE E. MALONE
Marshall Space Flight Center, Ala.
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April 14, 1994

RELEASE NO.:94-39

NASA ANNOUNCES PLANS TO CONSOLIDATE EXTERNAL TANK ADP SUPPORT, END OPERATION OF SLIDELL COMPUTER COMPLEX IN LOUISIANA

NASA announced today plans to consolidate Automated Data Processing (ADP) Support for the Space Shuttle external tank program with other Office of Space Flight administrative and program ADP activities at NASA's Marshall Space Flight Center in Huntsville, Ala. ADP support for the external tank provided by the Slidell Computer Complex in Louisiana will cease, and the agency in the near future will initiate action to declare the facility excess.

Local authorities have expressed interest in obtaining the Slidell facility for possible use for health care, education or municipal offices.

The consolidation resulted from a review of all NASA field activities intended in part to identify activities that could be consolidated to reduce costs. This action will result in substantial savings to the external tank program.

NASA officials said that Louisiana will continue to play a vital part in the Nation's space efforts. They pointed out that the commencement of the aluminum lithium external tank project for the Space Shuttle will enable the Michoud Assembly Facility in New Orleans to increase its staffing and will ensure the area a continued high-technology role in NASA's future.

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NASA News

National Aeronautics and
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For Release:

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RELEASE NO: 94-49

NOTE TO EDITORS/NEWS DIRECTORS

NASA'S SECOND INTERNATIONAL MICROGRAVITY LABORATORY MISSION SCHEDULED FOR LAUNCH IN EARLY JULY ABOARD SHUTTLE COLUMBIA

The second International Microgravity Laboratory mission, STS-65, is scheduled for launch in early July.

The spaceflight-- the 17th flight of Columbia and the 63rd Space Shuttle flight-- will be a Spacelab mission dedicated to research into the behavior of materials and life in the low gravity environment of Earth-orbit. The science mission is managed by the Marshall Space Flight Center in Huntsville, Ala., and will be controlled from the Spacelab Mission Operations Control center here.

More than 200 scientists from NASA, the European Space Agency, the French Space Agency, the German Space Agency, the Canadian Space Agency and the National Space Development Agency of Japan have cooperated in developing more than 80 experiments to be performed during the 14-day mission. Many of these scientists will be at the Marshall Center during the mission, assisting Columbia's crew in the conduct of their experiments.

Leading the STS-65 crew will be Mission Commander Robert D. Cabana. Pilot for the mission is James Donald Halsell, Jr. The four mission specialists aboard Columbia will be Richard J. Hieb, the STS-65 Payload Commander; Carl E. Walz; Leroy Chiao; and Donald A. Thomas. Chiaki Naito-Mukai from the National Space Development Agency of Japan will serve as payload specialist.

-More-

The attached press kit provides information on the IML-2 mission.

NASA's Spacelab news center will be operated around-the-clock at the Marshall Center, throughout the flight.

Written Spacelab mission status reports will be issued by the news center daily at approximately 6 a.m. and 6 p.m. Media desiring to receive the status reports by telefax should contact Jim Sahli at (205) 544-0034. Audio versions of the status reports will be available to media on the Marshall Audio News Service by calling (205) 544-NEWS.

News media seeking mission information or interviews with mission participants should contact the news center at (205) 544-6381 during the flight or call the Media Services Office at (205) 544-0034 prior to launch.

Coverage of the launch of Columbia and the STS-65 mission will be carried on NASA Select Television, which is available on Spacenet-2, Transponder 5, located at 69 degrees west longitude, frequency 3880.0 MHz, audio monaural 6.8 MHz.

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NASA News

National Aeronautics and
Space Administration

Marshall Space Flight Center
Huntsville, Alabama 35812

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RELEASE: 96-164

UNDERSTANDING SOIL BEHAVIOR IN EARTHQUAKES, MYSTERIES OF PROTEINS MAY BE UNLOCKED BY MARSHALL STUDIES ON ATLANTIS

Researchers -- seeking to gain a better understanding of soil behavior during earthquakes and to unravel mysteries of proteins found in all living organisms -- are sending their experiments into space aboard the Space Shuttle Atlantis, scheduled to launch Sept. 16.

The low-gravity environment of space will enhance these science investigations, managed by NASA's Marshall Space Flight Center in Huntsville, Ala.

The flight of Atlantis marks the fourth linkup of the U.S. Shuttle with the Russian space station Mir. And it will bring the return to Earth of U.S. Astronaut Shannon Lucid after a record-setting stay in space for a woman.

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Aboard Atlantis will be the Mechanics of Granular Materials experiment, which will look at the behavior of granular materials under very low stresses.

Results of the complete set of experiments aboard Atlantis and subsequent missions could have far-reaching implications, leading to improved selection and preparation of building sites, better management of undeveloped lands, and improved handling of materials in chemical, agricultural and other industries.

This research may be applied to diverse fields such as earthquake engineering, landslides, mining, soil erosion and the irreversible loss of enormous amounts of windblown, fertile soil. Other fields that may benefit from this research include coastal and off-shore engineering, off-road vehicle engineering, and the handling of granular materials such as grains and powders.

For years, scientists conducting studies of granular materials have been frustrated by Earth's gravity because samples collapse under their own weight in low-stress conditions. In Earth-based studies, it has proven difficult to maintain stability of water-saturated granular materials when pressure in the water increases -- a condition similar to what takes place during earthquakes and leads to the collapse of buildings and bridge foundations.

In space, correct measurements can be made because weight is not a factor, and it is possible to maintain the experiment's configuration without gravity's influence.

During the Atlantis mission, test information will be collected. Then the material samples will be returned to Earth and measurements will be taken to examine how the material has changed, to determine the motion of particle groups, and any instabilities.

-more-

Dry soil is being studied on this flight, but future Shuttle missions will test water-saturated soil. Some of these tests will be performed under cyclic loading, which is a condition encountered in earthquakes.

Dr. Stein Sture, a professor at the University of Colorado at Boulder, is the principal investigator of the experiment, and Dr. Nicholas C. Costes, a senior research scientist at Marshall Center, is the co-principal investigator. Buddy V. Guynes of Marshall is the project manager.

UNLOCKING SECRETS OF PROTEIN CRYSTALS

In another area of research slated for the flight of Atlantis, the crew will retrieve two closed aluminum cylinders, called dewars, holding hundreds of protein samples grown on the Russian space station Mir over the past nine months. And they will place aboard Mir another dewar filled with new samples to be grown in space during the next several months.

Proteins are important, complex biological molecules, serving a variety of functions in all living organisms. Determining their molecular structures can lead to a greater understanding of their functions and to development of new drug treatments targeting specific human, animal and plant diseases.

But crystals grown on Earth, affected by the forces of gravity, often have internal defects that make scientific analysis of their structures difficult, if not impossible. As proven on Shuttle missions since 1985, certain protein crystals grown in the weightless environment of space are larger, have fewer defects and a greater internal order than those grown on Earth.

The Atlantis mission will continue the longest unbroken flight program of crystal growth research in space. When these protein samples are returned to

Earth, they will be studied and compared to those grown on Earth, as well as to others grown in shorter time periods on previous Shuttle flights. Analysis of crystal experiments on previous missions shows successful growth of a number of uniform, high-quality crystals.

The lead investigator for these experiments is Dr. Alexander McPherson, a professor at the University of California at Riverside. Ron King of the Marshall Center is project manager for the study.

Atlantis crew members also will retrieve a second Marshall- developed crystal growth facility, called the Diffusion-Controlled Crystallization Apparatus for Microgravity, installed on the Mir last March. This apparatus uses the liquid-liquid diffusion and dialysis methods for protein crystal growth. Growth is triggered by two solutions which slowly approach supersaturation as they diffuse. Containing 162 experiment units, the diffusion device allows control over the rate of approach to supersaturation, and the crystals grow slowly and methodically over periods of up to six months.

Developed at Marshall Center's Laboratory for Structural Biology by lead investigator Dr. Dan Carter, the apparatus provides researchers a better opportunity to grow diffraction-sized crystals. Samples grown in space will be compared to those grown by the same method in ground-based studies. Serving as project manager for this experiment is Blair J. Herren of the Marshall Center.

Atlantis is scheduled to dock with Mir on the third day of its mission. Landing is scheduled at the Kennedy Space Center in Florida on Sept. 26, after a nine-day flight.

NASA News

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NEWS RELEASE: 99-180

Dr. John R. Rogacki Named Director of Marshall Center's New Space Transportation Directorate

- *Frederick Bachtel Appointed Deputy Director;*
- *McConnaughey, Smelser Take On New Managerial Duties*

Dr. John R. (Row) Rogacki has been named director of the new Space Transportation Directorate at NASA's Marshall Space Flight Center in Huntsville, Ala. The directorate is a key element created in a recent reorganization of the Center.

Frederick D. Bachtel, newly appointed deputy director of the Space Transportation Directorate, joins Rogacki in overseeing all space transportation projects performed at the Marshall Center.

The purpose of the new directorate is to strengthen the space transportation product line throughout NASA, unifying all related activities into a single organization to improve program efficiency and better serve Marshall's customers. The directorate takes a leadership role on all activities

- More -

pertaining to space transportation systems development and propulsion system research. It further provides integrated research, technical services and skills that support such NASA programs as the Space Shuttle, the Chandra X-ray Observatory and the International Space Station.

Additional appointments to the directorate are **Dr. Helen V. McConnaughey**, manager of the Vehicle and Systems Development Department, and **Jerry W. Smelser**, manager of the Technology Evaluation Department.

Rogacki, a 26-year U.S. Air Force veteran, was director of the Propulsion Directorate at Phillips Laboratory at Edwards Air Force Base, Calif., before he was appointed to the Marshall directorate. During his tenure at Phillips, he spearheaded design and delivery of space and missile propulsion technologies.

A native of Harrison, N.J., Rogacki is a 1973 graduate of the Air Force Academy in Colorado Springs, Colo. He earned a master's degree in mechanical engineering in 1983 and a doctorate in mechanical engineering in 1992 -- both from the University of Washington in Seattle.

While serving on active duty in the Air Force, Rogacki logged more than 3,000 flight hours as a command pilot in aircraft ranging from motorized gliders to heavy bombers. From 1985 to 1987, he served as chief of the B-52 Branch, Standardization and Evaluation Division, 42nd Bomb Wing, stationed at Loring Air Force Base in Maine.

Rogacki returned to the Air Force Academy in 1987 as associate professor of engineering mechanics and chief of the Materials Division. During

his tenure, he gained the distinction of being the first American engineer and military officer to lecture at Moscow State Technical University since the start of the Cold War.

In 1993, Rogacki joined Wright Laboratory at Wright-Patterson Air Force Base, Ohio, serving as chief of the Structures Division and managing nearly all the Air Force's fixed-wing aircraft structural research and development. He advanced in 1995 to deputy director of the Flight Dynamic Directorate at Wright Laboratory, where he was responsible for orchestrating research and development in flight control, aeromechanics and other core areas.

Rogacki, his wife Wanda and their children, Janina and John, will reside in Madison, Ala.

Prior to his appointment to the Space Transportation Directorate, **Bachtel** served as manager of Marshall's Space Transportation Programs, overseeing the development and demonstration of advanced technologies for reusable launch vehicles.

Bachtel, a native of Oberlin, Ohio, graduated in 1968 from the University of Cincinnati in Ohio with an undergraduate degree in aerospace engineering. By that time, he already had served Marshall for four years as a cooperative education student, working in the areas of thermal and environmental control for the Saturn and Skylab programs.

Bachtel spent more than two decades serving the Propulsion Laboratory in the Science and Engineering Directorate. He served in 1992 as chief engineer for vehicle design in the Heavy Lift Launch Vehicle Office and in 1993 was appointed chief engineer for the Space Shuttle Main Engine Project. In

1995, he was named deputy director of the Space Transportation Division of the Reusable Launch Vehicle Office.

Bachtel has received numerous NASA honors, including a 1985 NASA Exceptional Engineering Medal, a 1991 Exceptional Service Medal, a 1992 Manned Flight Awareness citation, and the Presidential Rank of Meritorious Executive for 1998.

He resides in Huntsville.

McConnaughey previously served as director of the Propulsion Laboratory for the former Science and Engineering Directorate. A former assistant professor at Mississippi State University, McConnaughey came to Marshall in 1985, initially joining the Structures and Dynamics Laboratory as an aerospace engineer before moving into the Propulsion Laboratory in a succession of leadership roles.

Smelser, who has been with Marshall since its establishment in 1960, comes to the directorate after serving as deputy manager of Space Transportation Programs. After spending his first 15 years at Marshall within the Science and Engineering Directorate, he turned his attention to the Space Shuttle Project, serving as project manager on a number of critical engine, tank and transport elements.

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Note to Editors/News Directors: For interviews with Dr. Rogacki and Mr. Bachtel, or to obtain photos supporting this release, media representatives may contact Ed Medal of the Marshall Center Media Relations Department at

5-5-5 Rogacki Named Director of Space Transportation

(256) 544-0034. For an electronic version of this release, visit Marshall's News Center on the Web at:

http://www.msfc.nasa.gov/news

NASA Photo #9904264: Dr. John (Row) Rogacki, director of the Space Transportation Directorate at NASA's Marshall Space Flight Center in Huntsville, Ala.

NASA Photo #9500408: Frederick Bachtel, deputy director of the Space Transportation Directorate at NASA's Marshall Space Flight Center in Huntsville, Ala.

These print-quality photos may be downloaded at:

http://www1.msfc.nasa.gov/NEWSROOM/news/photos/1999/photos99-180.htm

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NEWS RELEASE: 99-232

Three New Managers Appointed to Science Directorate At NASA's Marshall Center

Three new department managers have been appointed to the Science Directorate at NASA's Marshall Space Flight Center in Huntsville, Ala.

Ray J. Arnold has been named manager of the Earth Science Department, **Robin Henderson** has been named deputy for management of the Microgravity Research Program Office and **Robert J. Jackson** has been named manager of the Microgravity Science and Applications Department.

The Science Directorate -- a key element in the recent reorganization of the Marshall Center -- researches and develops new advances in microgravity science, space science, Earth science and space optics manufacturing. The directorate oversees all science programs at Marshall and partners with other government agencies, academia and industry to develop new technologies.

- More -

2-2-2 Three Marshall Managers Appointed

Arnold previously served as deputy manager of the Global Hydrology Research Office at Marshall. In his new position, he will oversee Earth sciences research at the Marshall Center, working to establish a world-class institution for research into global climate and study of the Earth's water cycle.

A native of Spring Hill, Tenn., Arnold earned his undergraduate degree in mathematics in 1965 from Auburn University in Auburn, Ala. In 1972, he earned his master's degree in business administration from Florida State University in Tallahassee.

Arnold's Federal career began in 1960 as a student trainee at Kennedy Space Center, Fla. He joined NASA Headquarters in Washington, D.C., in 1982, serving as deputy director of NASA's Earth Science and Applications Division. In 1987, he was reassigned as director of the Communications and Information Systems Division of the Office of Space Science and Applications. In 1990, he was named deputy assistant administrator for NASA's Office of Commercial Programs.

In 1993, Arnold was assigned to the United Nations Environment Program in Nairobi, Kenya, where he served as chief of environmental information management. There, he developed strategies for global access to environmental information, including a Web-based information management system and satellite-based telecommunications systems.

Arnold joined the Marshall Center in 1997. Since that time, he has been honored with the NASA Exceptional Service Medal. He resides in Huntsville.

- More -

3-3-3 Three Marshall Managers Appointed

Henderson previously served as deputy manager in the Microgravity Research Program Office. Under the reorganization, she continues to direct implementation of NASA's microgravity research activities, including scientific and commercial research conducted in space and ground-based investigations.

A Decatur, Ala., native, Henderson earned an industrial engineering degree in 1983 from the University of Alabama in Tuscaloosa. She joined the Marshall Center in 1983, working in the Program Planning and Control Office for the Hubble Space Telescope.

In 1986, she served a one-year assignment at NASA Headquarters, where her work contributed to development of the International Space Station, currently being assembled in space. She returned to Marshall in 1987 as assistant to the manager of the Space Systems Project Office. Her roles included business manager of the Upper Stage Projects Office and business manager and deputy manager of the Microgravity Projects Office.

During her years at Marshall, Henderson has been honored with numerous NASA awards, including the Exceptional Achievement Medal in 1996.

She resides in Decatur, and is married to Cecil Henderson. They have three children.

Jackson, who previously served as manager of the Microgravity Science and Applications Project Office, will oversee implementation of NASA's microgravity research program for the Materials Science and Biotechnology Research Programs and the Microgravity Multi-discipline Glovebox Program.

- More -

4-4-4 Three Marshall Managers Appointed

A native of Springfield, Tenn., Jackson graduated in 1960 from Middle Tennessee State University in Murfreesboro, where he earned undergraduate degrees in mathematics and physics.

Jackson joined the Marshall Center in 1962 as a systems engineer in the Aerodynamics and Astrodynamics Laboratories. He has held numerous positions at Marshall, including manager of the Spacelab Operations Development and Logistics System Office; chief engineer for the Spacelab Payload Integration project; and manager of the Space Station Operations and Utilization Office within the Flight Projects Office.

Jackson has been honored with numerous NASA awards, including two NASA Exceptional Service Medals and the NASA Silver Snoopy Award.

Jackson resides in Huntsville with his wife, Judith.

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Note to Editors/News Directors: For interviews with Arnold, Henderson or Jackson, media representatives may contact Steve Roy of the Marshall Center Media Relations Department at (256) 544-6535. For an electronic version of this release, visit Marshall's News Center on the Web at:

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